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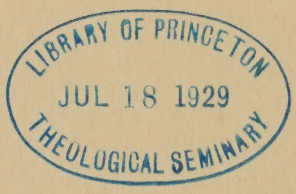

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SMITHSONIAN INSTITUTION
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SHABIK'ESHCHEE VILLAGE

A LATE BASKET MAKER SITE IN THE CHACO CANYON NEW MEXICO

BY

FRANK H. H. ROBERTS, JR.

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LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, D. C., July 10, 1928.

SIR: I have the honor to submit the accompanying manuscript, entitled "Shabik'eshchee Village, a Late Basket Maker Site in the Chaco Canyon, New Mexico," by Frank H. H. Roberts, jr., and to recommend its publication, subject to your approval, as a bulletin of this bureau.

Respectfully,

H. W. DORSEY, *Chief Clerk.*

Dr. C. G. ABBOT,
Secretary of the Smithsonian Institution.

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SHABIK'ESHCHEE VILLAGE

A LATE BASKET MAKER SITE IN THE CHACO CANYON, NEW MEXICO

By Frank H. H. Roberts, Jr.

FOREWORD

During the summer of 1926, while engaged in excavating a small pueblo ruin in the upper Chaco Canyon, N. Mex., for the National Geographic Society's Pueblo Bonito Expedition, the writer discovered the remains of a number of storage cists on top of the mesa which forms the southern wall of the canyon at that place. Pottery fragments lying on the surface and the character of the cists themselves suggested that at one time the site had been occupied by a cruder, less highly developed people than those of the Pueblo cultures whose ruined villages, great communal centers, and refuse mounds are to be found in such abundance throughout the length and breadth of the Chaco district. Two houses and several storage cists were uncovered, but extensive examination of such a site was not provided for in the program of excavations then being brought to completion. It was felt, however, that greatly to be desired information on an imperfectly known phase of southwestern archeology was to be obtained by careful investigation of this mesa top. Consequently, when the opportunity for field work was presented in the summer of 1927 the Chaco Canyon site was chosen.

The remains of the village had never been reported and it was unnamed. At the foot of the trail leading up to the site is a large rock upon which the Navahos have pecked a sun symbol. Navaho workmen employed in the excavations referred to the location as Sun Picture place. This has been deemed as fitting a name as any that could be applied to the one-time community. Hence the designation Shabik'eshchee village.

The writer wishes to thank Mr. Neil M. Judd, director of the National Geographic Society's Pueblo Bonito Expedition, who contributed in no small measure to the success of the summer's investigations by sharing his camp as well as transportation equipment with the Bureau of American Ethnology Expedition. Because of this kindness and whole-hearted cooperation much more was accomplished than would have been possible had the maintenance of a separate camp been necessary.

INTRODUCTION

In order that the village excavated during the summer of 1927 may take its proper place in the sequence of prehistoric southwestern cultures and that the reader may have some appreciation of the problems which confront the archeologists who are striving to reconstruct the stages in their development, a brief review of our present knowledge of the area may not be amiss.

That portion of the United States in which are found the Pueblo Indians and traces of their former homes, in the ruins of the pre-Columbian culture centers of their ancestors, comprises the territory included in the States of Arizona, New Mexico, southwestern Colorado, almost all of Utah, a small section of southeastern Nevada, and the great inland basin of the northern Chihuahua district of Mexico. Topographically the area is a high and arid plateau sloping away to the south and west from the Rocky Mountains.

The region has four large subareas in the drainage systems of the four main rivers—the San Juan, the Rio Grande, the Little Colorado, and the Gila-Salt. These streams, and the tributaries of each, are all that carry water the year around. It is in great part a desert country with little vegetation. There is some scanty grass, sagebrush, mesquite, and, where conditions are more favorable, cedar and piñon trees. On the slopes of the higher mountains spruce and pine are to be found.

There was comparatively little game in any but the mountainous districts and it was never extremely abundant there. It consisted chiefly of deer, bear, rabbit, wild turkey, grouse, and quail, with an occasional mountain lion and wildcat.

The soil of the area is such, however, that where water can be secured fairly abundant crops can be produced. That the prehistoric settlers of the region took full advantage of this productivity is shown by the countless ruins scattered throughout the area. There are the remains of great cliff dwellings, of communal structures built on the tops of mesas or on the canyon floors, small house sites, cavate lodges, and even in caves where there were no buildings there are additional evidences of the occupation of the region.

Each of the great river basins seems to have developed a culture with more or less distinctive characteristics in the peculiarities of house construction and grouping, in pottery types, baskets and textiles, while still retaining its relationship to the general widespread culture. The outstanding feature of the whole area may be summed

up in the statement that it was the home of a sedentary, agricultural people who built their houses either of stone or adobe, or both, made pottery, and wove textiles.

This house-building, pottery-making culture did not spring full blown from the soil but grew by degrees from a very simple beginning, covering a long period of time in its unfolding. The stages in its growth and development are shown in a number of periods during which the people passed from a simple hunting type to a relatively highly cultured group. To facilitate study of this growth the several cultural levels have been classified under two main headings, called the Basket Maker and the Pueblo. As might be expected, there are a number of phases, with distinct characteristics in each. The Basket Maker group, which is the older, has three, while the Pueblo has five.[1]

Basket Maker I

The Early Basket Makers were probably a more or less nomadic group sparsely scattered over the area. They depended to a large extent on the natural caves of the region for shelter, although, if necessity demanded, they may have erected flimsy, perishable dwellings to shield themselves from the vagaries of the weather. Small game, wild vegetable products, and such fruits as the country afforded furnished them with a meager supply of food. Later developments were foreshadowed, however, in their baskets and textiles. The appearance of corn, presumably coming from the highlands of Mexico or Central America to the south, led to the beginnings of agriculture and the second stage of their culture.

Basket Maker II

The Basket Makers proper were a semihunting, semiagricultural people. They grew a single type of hard, flintlike corn and had a variety of squash, but apparently built no permanent houses and made no pottery. They stored the grain from their crops in stone-lined pits located in the floors of caves. These cists were often put to a secondary use for burial purposes, and it is from these graves that the knowledge of their arts and industries has come down to us through the objects which they interred with their dead.

The chief industry seems to have been that from which the group takes its name, basket making, and in this they were skilled craftsmen. Their baskets, twined and woven bags, ropes, sandals, and other objects are of a high degree of excellence. In addition, they did some work in stone chipping. They made javelin points and

[1] Kidder, Southwestern Archeological Conference, p. 490.

various kinds of cutting edges. Several types of wooden implements were fashioned, but the bow and arrow apparently were unknown. The main offensive weapon was a rather short spear used in conjunction with a spear thrower or atlatl.

Present evidence indicates that it was at the very end of the period that the idea of making clay vessels developed. There was no true pottery, however. Thick, unfired containers of clay were crudely molded in baskets. To prevent cracking when the clay dried, small pieces of cedar bark were used as a binder. The idea of pottery making possibly came from the centers of higher culture to the south, but the development of it was unquestionably local.[2]

Basket Maker III

At about the time when the people were experimenting with mud containers and laying the foundation for the ceramic industry of succeeding periods another change is noted. They began to enlarge the excavations for their storage pits, to erect large stone slabs to serve as walls, and to construct pole, brush, and plaster coverings over them, so that the dwelling of a more or less permanent nature evolved. This marked the beginning of the Late Basket Maker or Basket Maker III phase. The period witnessed a slight decline in some of the woven materials and an advance in other industries. Ceramics progressed to a point where fired pottery with painted decoration made its appearance. Several varieties of corn were grown. Beans were added to the supplies of staple foods. Feather robes began to replace those of fur. The bow and arrow came into use. It was toward the end of this period that the village excavated in the Chaco Canyon was built and inhabited. Intervening between its abandonment and decay is the whole Pueblo cycle.

The Basket Makers are known to have occupied parts of southeastern and south central Utah, northeastern and southern Arizona, some sections of Nevada, portions of New Mexico and southern Colorado, and extended southward into Mexico. Indications are, however, that they reached their highest development in the San Juan area.

Pueblo I

Several features mark the beginning of the Pueblo era. The first period, frequently referred to as the pre-Pueblo, saw the arrival of a new group of people, a round-headed stock, who practiced cranial deformation. The preceding Basket Makers were long headed, doli-

[2] Guernsey and Kidder, Basket-Maker Caves of Northeastern Arizona, p. 98.
Nusbaum, A Basket-Maker Cave in Kane County, Utah, p. 144.
Morris, Beginnings of Pottery Making in the San Juan Area, pp. 138–152, 198.

chocephalic, and their skulls show no occipital flattening. The crude, one-room domiciles gave way to structures with several contiguous rectangular rooms the slab walls of which were frequently augmented by true masonry. Cotton was introduced, and fabrics made from it assume an important rôle in the material culture. The wild turkey was domesticated. Necks of large pottery vessels were left unsmoothed, showing the coils of clay from which they were made.

Pueblo II

The second Pueblo phase was the small-house period, which was marked by widespread distribution of life in small villages. In the San Juan area the general type of dwelling was that which has been called the unit or one-clan house.[3] The walls were completely constructed of masonry and the dwelling was entirely above ground. The houses contained several rooms, were one story in height, and there was generally a court on the south or southeast side. Beneath the courtyard was a circular ceremonial room or kiva. Corrugated pottery, so plentiful in southwestern ceramic collections, with elaborate indentations covering the entire surface of the vessel, was one of the distinctly characteristic features. The painted wares were quite generalized in style and form.

Pueblo III

The greatest period in the Southwest was that of Pueblo III when the large urban centers developed. It was during this phase that the finest examples of Pueblo architecture were completed. On the Mesa Verde were Spruce Tree House[4] and Cliff Palace.[5] In the Chaco Canyon Pueblos Bonito[6] and Chettro Kettle[7] were thriving centers. The inhabitants of the Mimbres Valley in southern New Mexico were making their pictorially decorated pottery,[8] Casa Grande[9] in Arizona was the scene of great activity. The proto-Kayenta villages[10] in the northeastern section of the same State were prospering. It was, in fact, the heyday of the Pueblo peoples.

Pottery had become specialized to such an extent that each center had its own definite forms, forms so characteristic that each vessel

[3] Prudden, Prehistoric Ruins of the San Juan Watershed, pp. 224–288.

[4] Fewkes, Antiquities of the Mesa Verde National Park: Spruce-tree House.

[5] Fewkes, Antiquities of the Mesa Verde National Park: Cliff Palace.

[6] Pepper, Pueblo Bonito. Judd, Everyday Life in Pueblo Bonito; Archeological Investigations at Pueblo Bonito.

[7] Hewett, Chaco Canyon and Its Ancient Monuments; The Excavation of Chettro Kettle, Chaco Canyon, 1920; The Chaco Canyon in 1921.

[8] Fewkes, Archeology of the Lower Mimbres Valley; Animal Figures on Prehistoric Pottery from Mimbres Valley; Designs on Prehistoric Pottery from the Mimbres Valley.

[9] Fewkes, Casa Grande, Arizona.

[10] Kidder, Southwestern Archaeology, pp. 72–73.

tells at once the place of its provenience. It is because of this fact that the trade relations between the various centers can be recorded; that the boundaries of stylistic influence can be traced.

The closing phase of the period was characterized by a marked decline in the great centers, the abandonment of many of them, and many migrations which as yet have not been traced. It is fairly certain that Kitsiel and Betatakin[11] in northeastern Arizona and many of the black-on-white sites, so called from the pottery, near Pecos, N. Mex., represent this phase.

Because of certain apparent relationships between the last stages of the great period and the more highly developed cultures to the south in Old Mexico, phase B, so to speak, of Pueblo III may be given the approximate dates of 1100 to 1300 A. D. These dates must not be considered as absolutely accurate, but they are based on evidence which makes them a fairly close approximation.[12]

Pueblo IV

There are two phases in the fourth period of the Pueblo cycle. The first is the protohistoric which extended from about 1300 A. D. to the time immediately preceding the arrival of the Spaniards in 1540. It was undoubtedly during this interval that Sikyatki[13] in the Hopi country and the early glaze ware sites of the Pajarito district along the Rio Grande flourished.[14] The latter part of Pueblo IV, from the arrival of the Spaniards to the end of the reconquest in 1696, is the Early Historic period which was characterized by a still further decline from the preceding cultural peak and the gradual disappearance of the corrugated pottery. This period is best represented by old Awatobi in the Hopi country which was destroyed in the autumn of 1700,[15] Hawikuh, near the present village of Zuñi, N. Mex., which was abandoned in 1670,[16] and Pecos,[17] not far from Santa Fe in the same State. There is, of course, a certain overlapping of periods. Hawikuh and Awatobi were thriving villages before the Spaniards appeared and Pecos continued to be occupied until 1838, but for general purposes they fall into the grouping suggested. It should be borne in mind that any classification must be to a certain extent arbitrary and often is not wholly satisfactory.

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[11] Fewkes, Preliminary Report on a Visit to the Navaho National Monument, Arizona, pp. 12–17.

[12] Tozzer, Time and American Archaeology, pp. 210–221.

[13] Fewkes, Expedition to Arizona in 1895, pp. 631–742.

[14] Kidder, Southwestern Archaeology, p. 86.

[15] Fewkes, op. cit., pp. 592–631.

[16] Hodge, F. W., Excavations at Hawikuh, N. Mex.; Excavations at the Zuñi Pueblo of Hawikuh in 1917.

[17] Kidder, op. cit., pp. 4–35.

Pueblo V

Pueblo V is the period of the modern villages and covers the interval from the final subjugation of the Pueblos by the Spaniards to the present day. It is the period which shows the gradual breaking down of Pueblo life under the influence of the white man.

Traces of the Pueblo I period are found throughout the entire San Juan region, in parts of the Upper Gila and Rio Grande districts and along the Little Colorado. There seems to have been a rather marked increase in population. Pueblo II ruins are found over the entire area, while the later development of the many-roomed, compact structures and great centers of Pueblo III show a contraction of the population. There was an even greater contraction in Pueblo IV with a rather marked decrease in population. Following this stage the tendency to dispersion again appeared and in very recent times there has been a marked breaking up of villages and development of small communities.

Present Status of the Study

The story of the rise and decline of southwestern sedentary cultures is in the main as outlined in the foregoing paragraphs. As further investigations bring more evidence to light there no doubt will be changes in some portions of the account, but the framework will remain essentially the same. The Basket Makers constitute a still imperfectly known chapter. This is especially true of their first period which, thus far, is largely postulated, although evidence of it has been found in one, possibly another, locality. The second stage, that of the Basket Makers or Basket Maker II, was until recently the best known of the three horizons in the culture. Now, however, there are more data on, and there is a fuller knowledge of, the Late Basket Makers, or, as they sometimes are called, the Post-Basket Makers.

It was for the purpose of obtaining much-needed information on the house and village types of the final period in the Basket Maker era that the excavations in the Chaco Canyon were conducted. Most of the previous work had been done at sites located in caves where later occupants had to some degree disturbed the older remains. Occasional Basket Maker III houses had been excavated but not in sufficient numbers to warrant definite conclusions as to their types. The Chaco Canyon site was an especially fortunate one because it was in the open and no later buildings had been erected upon it. It was an isolated example of a single cultural stage.

The results obtained from the excavations far surpassed expectations and from the information secured a much clearer picture can be

drawn of the houses and house life of the days immediately preceding the appearance of the Pueblo peoples.

There is still a large problem to be solved in connection with the Basket Makers, however, and that is the question as to what became of them. Were they absorbed by the incoming peoples or did they drift away to settle in other sections of the country and there carry on their established industries? This is a question which, in the present state of our knowledge, can not be answered. Some of the investigators profess to see in the modern Mohave and Paiute peoples the remains of the old Basket Makers. Others are of the opinion that they were completely absorbed by the newer arrivals in the Southwest and that all traces of them were obliterated through the resulting mixture and the widespread practice of cranial deformation. The problem is as yet untouched.

On the cultural side there seems to have been a very even and gradual development from the one group into the other and in places the change is so slight that there is no perceptible break. It is true that some new features were introduced, but on the whole the Pueblo peoples seem to have taken over most of the things that their predecessors developed and to have built their own cultures on the firm foundation already established.

The San Juan Region

As has been suggested in the foregoing discussion, the San Juan region was one of the most important in the entire area. It seems to have been the center from which many of the characteristic features of the sedentary cultures were diffused and for a long time was the leader in their development. It is the northernmost of the four great territorial divisions of the area and unquestionably is the best known archeologically.

The San Juan itself and its northern tributaries, the Piedra, Pine, Animas, and Mancos, have their sources on the slopes of the San Juan Mountains in southern Colorado. They are the only streams which carry a never-failing supply of water. The three great tributaries from the south, the Largo, Chaco, and Chin Lee, are almost wholly dry for a great part of the year.

In the northeastern part of the drainage where the mountains and higher hills abound there is a comparatively thick forestation. Pine, spruce, cedar, and piñon trees are rather abundant. On the lower levels are the small-growing oaks, mesquite bushes, and sagebrush. There is quite an abundance of yucca, the Spanish Bayonet, in both the broad and narrow leaf varieties, also many forms of cactus. Where the river bottoms open out cottonwoods and willows flourish. Once the mountains have been left behind, however, the region

becomes one of great barren stretches, with only occasional cedars and piñons on the mesa tops, clumps of sagebrush, and rather scanty grass. The summers are very hot and dry and the winters cold.

The Chaco Canyon

The Chaco Canyon bears an important relation to the San Juan region in that some of the finest examples of buildings of the great Pueblo period, Pueblo III, are to be found there. Not only is this true, but there is evidence to show that it was occupied for a long period of time, unquestionably from Basket Maker III through Pueblo I, II, and III. Even then its history was not completed, because during the tempestuous days of the Pueblo revolt, 1680–1696, it served as a place of refuge for some of the warring factions which were forced to flee from the avenging Spaniards. In more recent times it has become the home of small groups of Navaho Indians.

From a purely scenic standpoint the Chaco Canyon is not impressive and can not be compared with the Mesa Verde to the north or with the Kayenta country to the west. The canyon itself is quite narrow, at no point being a mile wide. Its walls are of red sandstone and the mesa tops on either side are almost barren. There are a few stunted cedar and piñon trees, some sagebrush, and scanty grass. Near its upper end, however, there are pines and the smaller trees are more numerous. In all directions the region is marked by shifting sand, great dry washes, deep arroyos, and a lack of vegetation. For one reason or another, however, this was a favored spot in the eyes of the early peoples, as is shown by the 11 large pueblo ruins and the almost countless numbers of small house sites scattered along its length.

SHABIK'ESHCHEE VILLAGE

THE RUINS

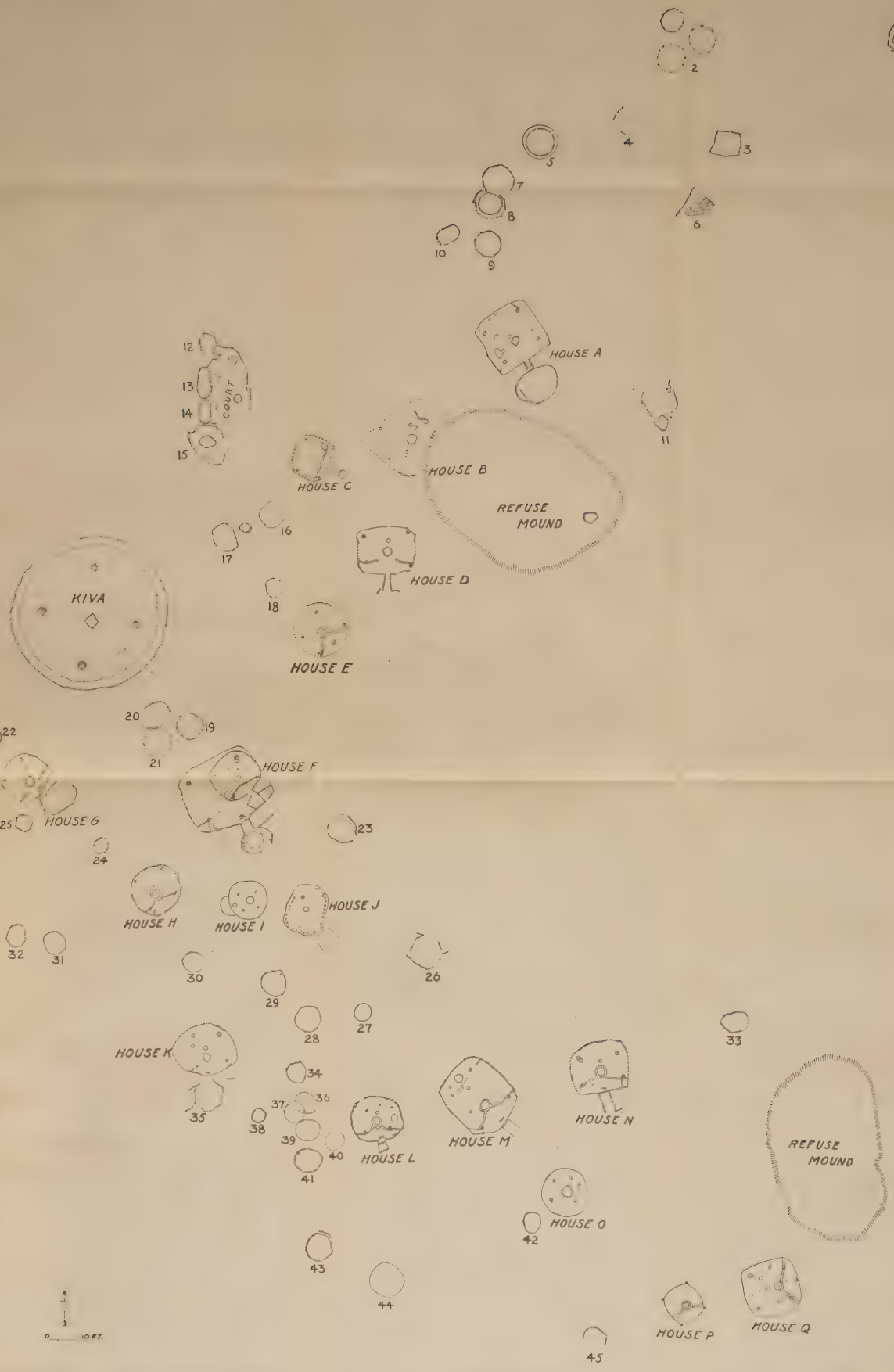
Shabik'eshchee village was located on top of the mesa which forms the southern wall of the canyon 9 miles (14.49 k.) east of the great pueblo ruins of Bonito and Chettro Kettle. It was very close to the edge of the escarpment and originally consisted of 18 houses, a small court, a large circular ceremonial structure or kiva, and 48 storage bins.

Before excavations were started the only surface evidence that the remains of a once thriving community lay buried beneath the sand was in the slightly projecting tops of a few of the stone slabs used in the construction of the storage cists and in the scattered fragments of pottery. There were no indications of houses or kivas. Soon after work was commenced the trenches began to reveal the remains of crude one-room domiciles, and at the end of the season there stood exposed to view all that was left of a small village, one in which the dwellings followed the curve of the mesa top, extending northeast and southeast from an almost central kiva. (Pl. 1.)

The houses had indeed been primitive. They had consisted of a circular, oval, or rectangular excavation roofed over with a pole, brush, and plaster superstructure. The earth walls of the excavation were covered with thick plaster made from adobe which occasionally had a slight admixture of ashes. Oftentimes large stone slabs were used to line the excavation. When this was done the plaster was applied to the faces of the slabs. It was this use of stone slabs which led, in earlier reports on this cultural stage, to widespread references to the slab-house people. Close to the house in most cases were small circular, oval, or rectangular pits in which the corn, raised on the canyon floor below, was stored. These, too, had had pole, brush, and plaster coverings.

House A

A good example of the rectangular dwelling was found in house A. (Pl. 2, *a;* fig. 1.) All that remained was the excavation, but there was sufficient evidence in the débris-filled interior to indicate what the structure had been like. Large slabs had been used to line one and portions of two other sides of the excavation, the remainder having had the plaster applied directly to the native earth.



MAP OF SHABIK'ESHCHEE, VILLAGE

In the floor, about 2 feet (60.96 cm.) from each corner, were four holes containing fragments of decayed wood; the remains, no doubt, of posts which had supported the upper walls and roof. Judging from the size of the holes the posts must have averaged about 10 inches (25.4 cm.) in diameter. These roof supports had been placed approximately in the directions of the four cardinal points of the compass.

There was nothing to indicate that such had been the case, but it is highly probable that the upper ends of the support posts had been

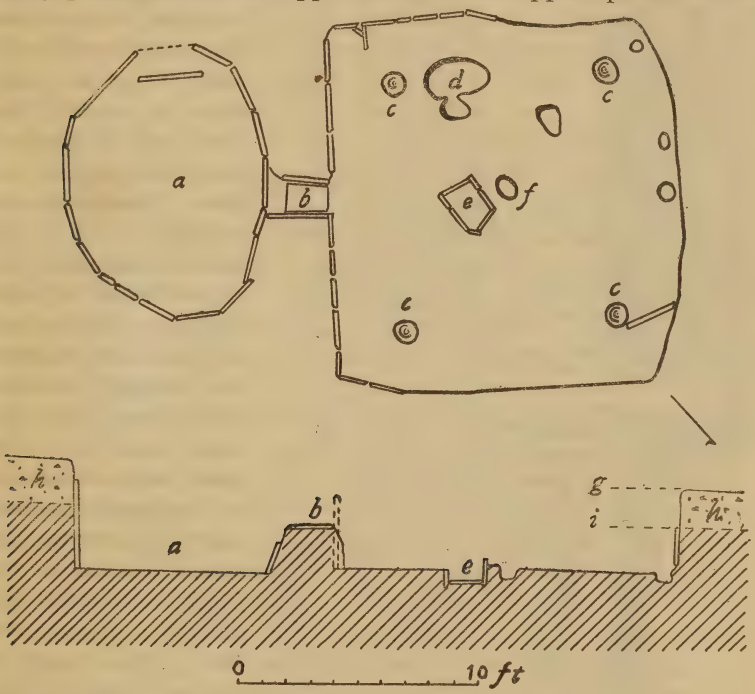


FIG. 1.—Plan of House A. *a*, Antechamber. *b*, Passage. *c*, Holes for support posts. *e*, Fire pit. *f*, Sipapu. *g*, Present ground level. *h*, Débris of accumulation. *i*, Ground level at time of occupation of house

forked, a tree trunk with a suitable crotch having been used for the purpose, to hold crossbeams. The latter formed a rectangular framework against which were placed the upper ends of small poles, the lower ends of which were embedded in the earth around the periphery of the excavation. These formed the sloping upper walls of the house. There was plentiful evidence of these small poles not only in this ruin but in many of the others as well. The rectangular space at the top probably had a flat roof with an opening in the center to serve as a smoke hole, possibly on occasions as an entrance. The entire framework was then covered with twigs, bark, leaves, earth,

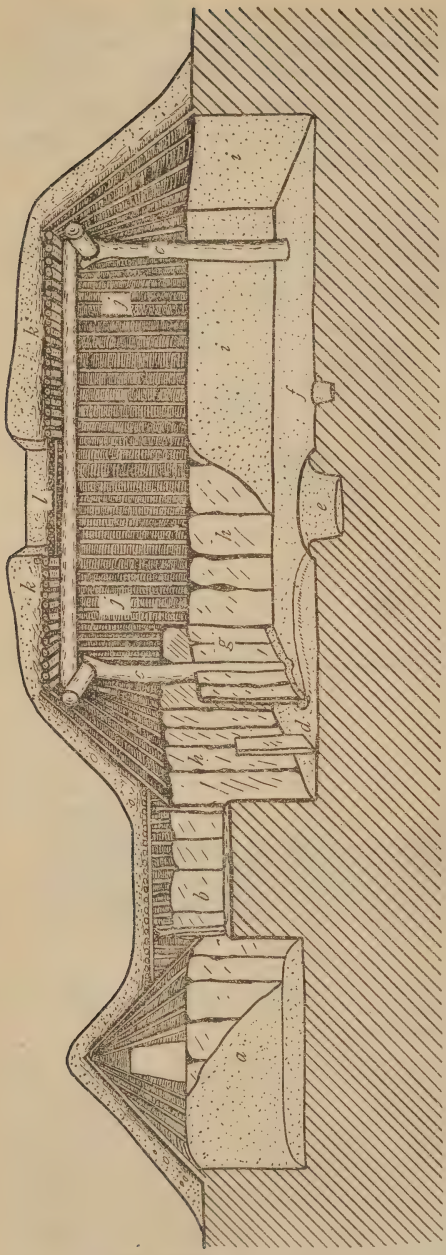


FIG. 2.—Postulated method of house construction. *a*, Antechamber. *b*, Passage. *c*, Support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu. *g*, Compartment wall. *h*, Slabs lining periphery of pit. *i*, Plastered walls. *j*, Pole and brush framework. *k*, Earth and plaster covering on superstructure. *l*, Smoke hole

and a thick coating of plaster (fig. 2), indicated by the finding, in the débris which filled the room, of large pieces of plaster bearing the imprint of leaves, sticks, and bark.

This type of superstructure is known from other localities as well. It varies somewhat in specific features, but the general characteristics are the same. Doctor Kidder and Mr. Guernsey found the remains of a circular room in Hagoé Canyon, northeastern Arizona, in which there was a small offset or bench into which the butts of 2 to 3 inch poles were driven at such an angle that they must have met over the center of the room at a height of about 6 feet (1.8288 m.) above the floor. There were no support posts in this structure, however, and the roof seems to have been conical rather than flat-topped. It was of the type suggested by the storage bins of the Chaco site.[18] Mr. N. M. Judd found a form of super-

[18] Kidder and Guernsey, Archeological Explorations in Northeastern Arizona, pp. 43–44, fig. 18.

structure practically identical with those indicated by the ruins of Shabik'eshchee village in the remains of a dwelling not far from Pueblo Bonito which he excavated in 1922.[19] Judd also reports a similar construction for the coverings of the earth lodges which he investigated near Willard, Utah.[20] The latter structures, however, seem to belong to a cultural phase more nearly approximating Pueblo I than the Basket Maker III horizon. Doctor Cummings found a number of excavated circular rooms which had been roofed over with poles, brush, cedar bark, and plaster in the same region as the Kidder and Guernsey example just described.[21] Mr. Morris reports the same thing from Mummy Cave in Canyon del Muerto, northeastern Arizona, where he found roughly circular pits which had had upper walls "of posts set leaning inward and plastered over with mud, and the roofs of logs covered with earth."[22] Doctor Hough found pole and brush coverings supported by posts in the pit ruins which he excavated near Luna, N. Mex., but the roofs were quite different in that there seems to have been a central pillar. These houses represent a later period, however, and are not to be considered as Basket Maker III dwellings.[23] Dr. Ralph Linton found a conical type of superstructure without interior support posts in Earth Lodge A on the Mesa Verde. This structure was unquestionably of the Basket Maker III period.

Near the center of the room of house A was a rectangular fire pit lined with small stone slabs with the tops flush with the plastered floor. It was well made but quite shallow. Close to the fire pit, in almost the exact center of the room, was a small oval hole filled with clean sand. Just what its purpose was is not clear. There was a similar feature in a majority of the houses. It is possible that it represented the same thing as the small hole found in about the same position in the floors of later-day kivas. The latter, called the sipapu, symbolized the mythical place of emergence through which the Hopi, Zuñi, and other southwestern Indians believe their ancestors passed on their journey from the underworld to the surface of the earth. It may well be that in the days when Shabik'eshchee village was inhabited each house had its own shrine, whereas in later times it was deemed essential only to the ceremonial house, the kiva. A more practical explanation would be that it was merely a place to set vessels where the heat from the fire would keep their contents warm. The rounded bottoms of the containers would necessitate some support to keep them in an upright position, and a hole filled with sand would admirably serve such an end. Because of the small

[19] Judd, Two Chaco Canyon Pit Houses, p. 405.
[20] Judd, Archeological Observations North of the Rio Colorado, p. 8.
[21] Cummings, Kivas of the San Juan Drainage, p. 274.
[22] Morris, Exploring in the Canyon of Death, p. 272.
[23] Hough, Explorations of a Pit House Village at Luna, N. Mex.

size of the holes in some of the houses, however, it seems more likely that they had some such significance as that first suggested.

There were other small holes in the floor which no doubt served as storage places for small objects. At one side of the room was a fairly large oval depression in which there was a metate or milling stone upon which the corn was ground into meal. In addition to the depression for the metate there was a smaller one at one side which no doubt served as a rest for the mano or hand stone used in the milling operations.

At the northern corner of the room there was a ridge of plaster extending out from the wall to the edge of the hole where the support post had been placed. It was quite low and narrow but marked off that portion of the floor space from the remainder of the room. What purpose it was intended to fulfill is not known. It was too low to have been the retaining wall for a storage bin.

One feature generally found in most of the houses was missing from this particular structure. There was no compartment or section partitioned off from the rest of the room. This was usually the portion nearest the door. As this feature is clearly shown in some of the other houses to be described, further consideration of it will be reserved for a later paragraph.

A distinctive characteristic of many of the houses of the Chaco group was the entryway on the south or southeast side.[24] At house A it was more elaborate than in most of the structures. The doorway of the main room gave access into a short raised passage, which in turn opened into an oval room. The latter was roofed in much the same fashion as the main dwelling, except that there were no interior support posts. Because of its smaller size the poles sloping from the sides to the center could carry the weight of the superstructure without additional support. They probably met at the center, giving a conical shape to the roof. The exterior opening of this antechamber seems to have been at one side, the west, rather than opposite the doorway into the house proper.

One curious feature associated with the doorway to the antechamber was a large slab of stone set upright in front of it a short

[24] A good illustration of this feature in a slightly different form is to be found in three structures on top of the bluff between McElmo and Yellow Jacket Canyons, just east of their juncture, in southwestern Colorado. They were first referred to by Mr. W. H. Jackson (Ruins of Southwestern Colorado and Adjacent Territory, pp. 413, 414), then by Doctors Kidder and Morley (Archæology of McElmo Canyon, pt. 1, pp. 44, 45), and more recently by Dr. J. W. Fewkes (Prehistoric Villages, Castles, and Towers of Southwestern Colorado, pp. 60–62). The writer inspected them on two occasions and is convinced that they represent a later stage in the period, perhaps are on the very border line between Basket Maker III and Pueblo I cultures.

Dr. Ralph Linton (The Small Open Ruins of the Mesa Verde, unpublished manuscript in files of Bureau of American Ethnology) found a quite similar feature in Earth Lodge A on the Mesa Verde. The vestibule was rectangular in this instance, however, and somewhat different from the ones in the Chaco, although comparable to them.

distance from the wall. (Fig. 1.) It may well have served as a step, although a little high for such a purpose. This was one of two houses where such a slab was found in the antechamber. In many of the others there was a similar stone in front of the main doorway.

At the south side of the short passage leading from the antechamber to the main room there was an interesting suggestion of the beginning of true masonry. Several large slabs had been placed flat above the tops of the vertical stones in that portion of the wall. The horizontal slabs were embedded in thick masses of adobe mortar. They had been used to increase the wall height to a slight extent, and their upper surfaces probably formed a narrow shelf between the edge of the wall and the slanting poles of the superstructure. There is evidence here that even at this early stage in house building the idea of horizontally laid slabs and walls of true masonry was beginning to develop. It was some time, however, before it progressed to the point where it was an important factor in the construction of domiciles. A similar feature is to be observed in two other structures on this mesa top.

The main room of house A was practically square. It measured 15 feet 6 inches by 14 feet 6 inches (4.7244 m. by 4.4196 m.). The floor of the room was 2 feet 6 inches (76.2 cm.) beneath the original ground level. On the door side the slabs rose 3 feet (91.44 cm.) above the floor, while the plastered walls opposite were only 2 feet (60.96 cm.) high. The ceiling in the flat portion of the superstructure must have been about 6 feet (1.8288 m.) above the floor. The slant of the upper walls, as shown from the measurements of the postholes in the adobe, was at an angle of 56°. At such an angle, and with the supporting posts at the distance that they were from the wall, the height of the ceiling can be fairly accurately postulated as being about the figure given. The fire pit measured 1 foot 3 inches (38.1 cm.) by 1 foot 10 inches (55.88 cm.), with an average depth of 6 inches (15.24 cm.). The oval hole near the fire pit measured 1 foot (30.48 cm.) on the long diameter, 8 inches (20.32 cm.) on the short diameter, and had a depth of 6 inches (15.24 cm.). The doorway was 16 inches (40.64 cm.) wide and the passage leading from the room to the antechamber was 2 feet 6 inches (76.2 cm.) long on the floor level. It no doubt had greater length along its top because of the slant of both the main room and antechamber superstructures. The floor of the passage was 2 feet (60.96 cm.) above the floor of the dwelling. The antechamber measured 11 feet by 8 feet (3.3528 m. by 2.4384 m.). Its floor was 2 feet 6 inches (76.2 cm.) below the original ground level. The height of the passage is not known and there was nothing in this particular ruin to indi-

cate what it might have been. From evidence secured in some of the other houses, however, it is fairly safe to state that it probably was about 2 feet (60.96 cm.).

House B

This structure gave evidence of having been abandoned at some date prior to that of the entire village. Most of the slabs which had

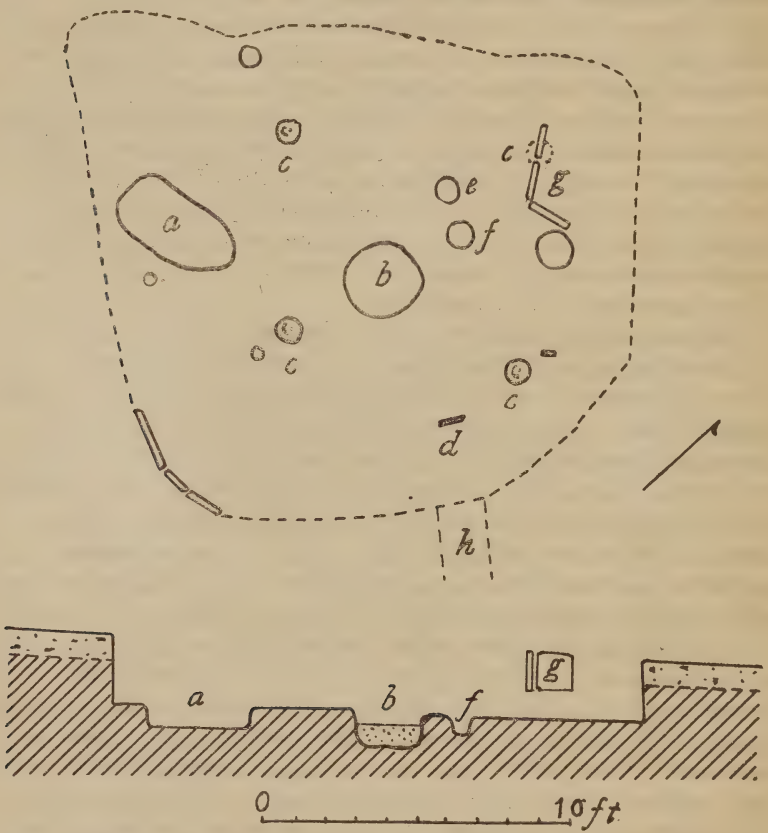


Fig. 3.—Plan of House B. *a*, Oval pit in floor. *b*, Fire pit. *c*, Support posts. *d*, Deflector. *e*, Storage hole in floor. *f*, Sipapu. *g*, Bin erected after abandonment of house. *h*, Remains of passage

been used to line the excavation had been removed, probably for use in other structures. Some of them possibly found their way into the walls of house A. From what remained of the dwelling, however, it was possible to determine that it had in a general way corresponded to the others. It had been irregular in shape (fig. 3), although it might be referred to as roughly rectangular.

The interior features seemed to have been quite similar to those already mentioned in connection with house A. There was a central fire pit, circular in this case, sipapu, post holes, depression for the mealing bin, and indications of an entrance on the southeast side. There was sufficient evidence of the passage, but if it had at one time had a chamber at its outer end all traces of the latter had vanished. In the interior of the room there was an upright stone slab set in the floor in front of the doorway. This slab stood between the doorway and the fire pit and recalls the deflector of the later kivas. It no doubt served the same purpose—kept cold air from rushing through the doorway and directly onto the fire.

During the excavation of the room it was found that the bin indicated by the slabs in the north corner (fig. 3) was of later date. The bottom of this small cist was 1 foot (30.48 cm.) above the floor of the dwelling. At some time after the house had been abandoned a storage cist had been built on the same site. This feature was apparent in several of the dwellings and indicates that all of them were not occupied contemporaneously.

Another secondary feature was a burial which had been made in the oval pit which had served as a mealing bin. The pit had not been large enough for the body and instead of enlarging the hole the head had been placed on the floor at one end and the feet projected in the same fashion at the other.

House B was slightly longer than it was wide. It measured 15 feet 6 inches by 18 feet (4.7244 m. by 5.4864 m.) and averaged 2 feet (60.96 cm.) in depth. It must be borne in mind, however, that the actual measurements of the room were somewhat smaller at the time when it was occupied. The removal of the slabs made it impossible to secure any but the dimensions of the hole. The circular fire pit was 2 feet 6 inches (76.2 cm.) in diameter and had a depth of 1 foot 5 inches (43.18 cm.). The lower 10 inches (25.4 cm.) had been filled with clean sand. The sipapu was considerably north of the center of the room. It was quite large, measuring 10 inches (25.4 cm.) in diameter. Its depth was 6 inches (15.24 cm.). The mealing bin was 4 feet (1.2192 m.) long by 2 feet (60.96 cm.) in width and had a depth of 8 inches (20.32 cm.). The holes in which the support posts for the superstructure had been set averaged 2 feet (60.96 cm.) in depth. The entrance passage appeared to have been about 1 foot 6 inches (45.72 cm.) in width and 2 feet 6 inches (76.2 cm.) in length.

House C

From several different standpoints house C had been a very interesting structure. (Pl. 2, *b;* fig. 4.) It differed from the two dwellings previously described in that no slabs were used to line the walls

of the excavation. Plaster had been applied directly to the native earth. The excavation had been made in such fashion that there was a small encircling bench at the top. In this bench were placed the ends of the small poles which formed the framework for the sloping upper walls. (Pl. 3, *a*.) The four posts which supported the superstructure were not placed in the floor some distance from the walls, as in the other houses, but were incorporated in the bench.

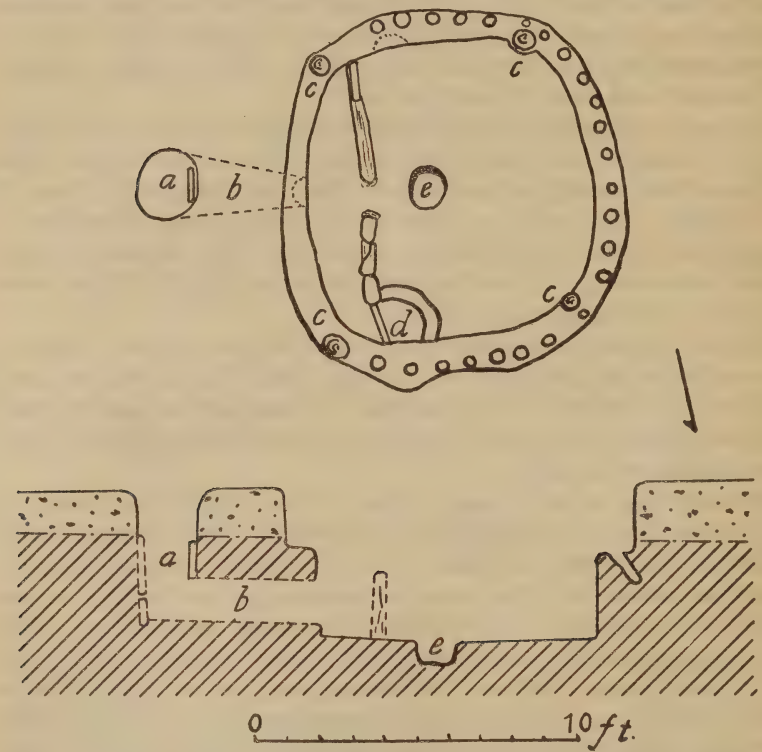


FIG. 4.—Plan of House C. *a*, Ventilator shaft. *b*, Ventilator passage. *c*, Support posts. *d*, Corner bin. *e*, Fire pit

They were several incnes in front of the smaller poles, and on the western half of the room projected from the walls, so that there was a decided bulge in the plaster.

The removal of the support posts from the interior of the room itself would have been a decided advantage in giving greater floor space, but it does not seem likely that in this particular case it was the impelling motive behind such a construction. The obvious explanation lies in the fact that the floor of the room was the cap rock of the mesa top, and the digging of holes for setting posts would have been an extremely difficult task. As a consequence the main

supports were placed in the wall. Just such an occurrence as this no doubt led to the discovery that a better room was to be had when the roof was supported by posts which did not occupy valuable floor space.

Another circular pit dwelling showing the same feature, but probably of a somewhat later date, was discovered in the floor of the cañyon about 1 mile (1.6 k.) east of Pueblo Bonito and excavated by Mr. N. M. Judd in the spring of 1922.[25] In this case, however, the main support posts were completely incorporated in the bench of the structure and did not project from its face. The general features of this house seem to have been quite similar to the structure under consideration, although there was no sipapu and, unfortunately, the whole southern half of the dwelling had been cut away by an arroyo encroaching upon it at that side. Hence it is impossible to tell whether or not it had the compartment and entryway features so apparent in the present group.

The change from support posts set at some distance from the wall to those incorporated in it was not as abrupt in all localities. The writer excavated a number of ruins along the Piedra River in southwestern Colorado where the support posts were placed against the wall but not included in it. In the general development of the house the intervening step would appear to be the natural one taken. The stage was finally reached where the support posts were actually a part of the upper wall. The latter feature was found in house J of the group in the Chaco Canyon. When walls of true masonry replaced those of slabs and adobe the flat roof was carried by the walls themselves and additional stories became a possibility. It was unquestionably in this manner that the type of building so common in the Pueblo periods was evolved.

There was no sipapu in house C. The circular fire pit had been hollowed out of the solid rock and had been plastered at the same time as the floor.

On the southeast side of the room there was a binlike compartment which had been formed by the erection of an adobe wall containing a few large stones. (Pl. 2, *b*.) Most of the latter were at the top of the wall, where they formed a kind of coping. The large block of stone at the bottom, on the right side of the doorway, which is shown in the photograph, was a part of the cap rock of the mesa. The northern and southern ends of the walls had upright slabs joining them to the main wall of the room. In the center of the low partition was an opening or doorway. This was directly in front of the opening into the passage.

At the northern end of the small partition, on the room side of the wall, was a small inclosure formed by a ring of adobe plaster.

[25] Judd, Two Chaco Canyon Pit Houses, p. 405.

(Pl. 3, *b*.) It no doubt had served the purpose of a storage place for things connected with the daily life of the inhabitants. On the opposite side of the room, at the southern end of the low cross wall, again on the room side of the partition, was a small recess in the main wall. (Pl. 3, *c*.) This probably served as a cupboard. It had been constructed by digging a rectangular hole in the wall and plastering the earth over with adobe. It was the only example of a wall cupboard found in the entire village.

The passageway and entrance of house C differed from the others in the village in that it could not possibly have been used for an entrance. It was too small and could have served only as a ventilator. In fact it was distinctly comparable to the ventilator in the kivas of the Pueblo area. The floor of the passage was slightly higher than that of the room and sloped upward toward the shaft at its outer extremity. The lower part of this tunnel was cut in the cap rock and bits of wood in the débris taken from it suggested that it had had a timbered covering.

The vertical shaft at the outer end of the passage had been slightly oval in form and was lined with stone.

The deflector associated with this passageway ventilator was not set in the floor as was the case in house B, but was a movable stone which closed the opening in the low cross wall. At the time of excavation this slab was in position in front of the opening in the partition.

As has been said before, the passage was too small to serve as an actual entrance, except possibly for small children, so it must have served solely as a ventilator. With a fire burning in the pit in the center of the room the heat rising from it and passing out of the hole in the roof above would draw cold air down the shaft through the tunnel and into the room. Here, then, is what may be considered an example of the step which led from the true entrance to the ventilator. Because of the fact that the ventilator had at one time been the actual entrance to the dwellings there must have been some ceremonial significance attached to it and it was in all probability retained at first more for this reason than because of its utility.

Criticism frequently has been made of the term " ventilator " when used in connection with similar features in the kivas of the Pueblo periods. The objection raised is that the Puebloans were not sufficiently versed in the laws of physics to construct ventilators. As a matter of fact, they did not need to be conversant with such laws. They profited by their operation and no doubt came to realize in time that the retention of the old passage, even though in a reduced and altered form, had distinct advantages from a purely practical stand-

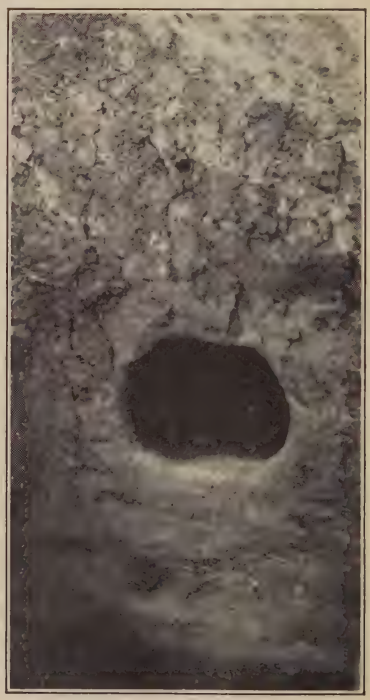
a, House A

b, House C

HOUSE REMAINS

a, Bench at top of wall, showing holes for roofing poles

b, Corner storage box formed by an adobe ridge



c, Wall recess or cupboard

HOUSE C

point. In fact, there is quite a little evidence to suggest that the ventilator was retained long after it had ceased to have a marked significance ceremonially. There was so much about house C which suggested the later-day kivas that it might be called a protokiva.

House C was somewhat smaller than houses A and B. Its diameter on the floor level was 9 by 9 feet (2.7432 m. by 2.7432 m.). The average width of the small bench into which the roofing poles had been set was 10 inches (25.4 cm.). There had been 24 of the small poles in the portion of the periphery extending from the northern end of the low cross wall, around the main portion of the room, to its southern end. Judging from the size of the holes in the top of the bench these small poles had an average diameter of 3 inches (7.62 cm.). The larger support posts seem to have averaged about 6 inches (15.24 cm.) in diameter. They did not rest on the floor. Their butt ends were, on an average, about 10 inches (25.4 cm.) above the floor level.

The plastered wall of the room was 2 feet 6 inches (76.2 cm.) high on the west side and 3 feet (91.44 cm.) on the east side between the two support posts located in that section of the periphery. The greater height of the wall on the entrance or ventilator side of the room seems to have had some significance, as it was found in practically all of the ruins. It may, in fact, have had a direct bearing on one of the features in the later kivas. Discussion of this point, however, will be reserved for a later section of this paper where the question of kivas will be considered.

The ridge of plaster bounding the inclosure in the corner formed by the wall of the room and the partition was 4 inches (10.16 cm.) high, 6 inches (15.24 cm.) thick at the base, and an average of 3 inches (7.62 cm.) thick at the top. The inclosure which it formed measured 1 foot (30.48 cm.) on the north side and 1 foot 3 inches (38.1 cm.) on the east. From the corner to the center of the curved ridge, on the floor, was 1 foot 3 inches (38.1 cm.).

The cross wall averaged 2 feet (60.96 cm.) in height and 4 inches (10.16 cm.) in thickness. The opening in the center was 8 inches (20.32 cm.) wide.

The doorway or opening into the passage or ventilator was 1 foot 4 inches (40.64 cm.) high by 11 inches (27.94 cm.) wide. The floor of the passage was 3 inches (7.62 cm.) above the floor of the room at the sill of the doorway. The passageway measured 3 feet 6 inches (1.0668 m.) in length. The vertical shaft at its outward end was 2 feet by 2 feet 3 inches (60.96 cm. by 68.58 cm.) in diameter. Its depth from the original ground level was about 2 feet 6 inches (76.2 cm.).

The wall cupboard was 10 inches (25.4 cm.) above the floor and measured 8 inches (20.32 cm.) high, 9 inches (22.86 cm.) wide, and

10 inches (25.4 cm.) from front to back. It was 1 foot (30.48 cm.) from the end of the cross wall.

The fire pit was 1 foot (30.48 cm.) by 1 foot 4 inches (40.64 cm.) in diameter and had a total depth of 8 inches (20.32 cm.). The sides were not straight up and down, but sloping, so that the pit was slightly bowl-shaped.

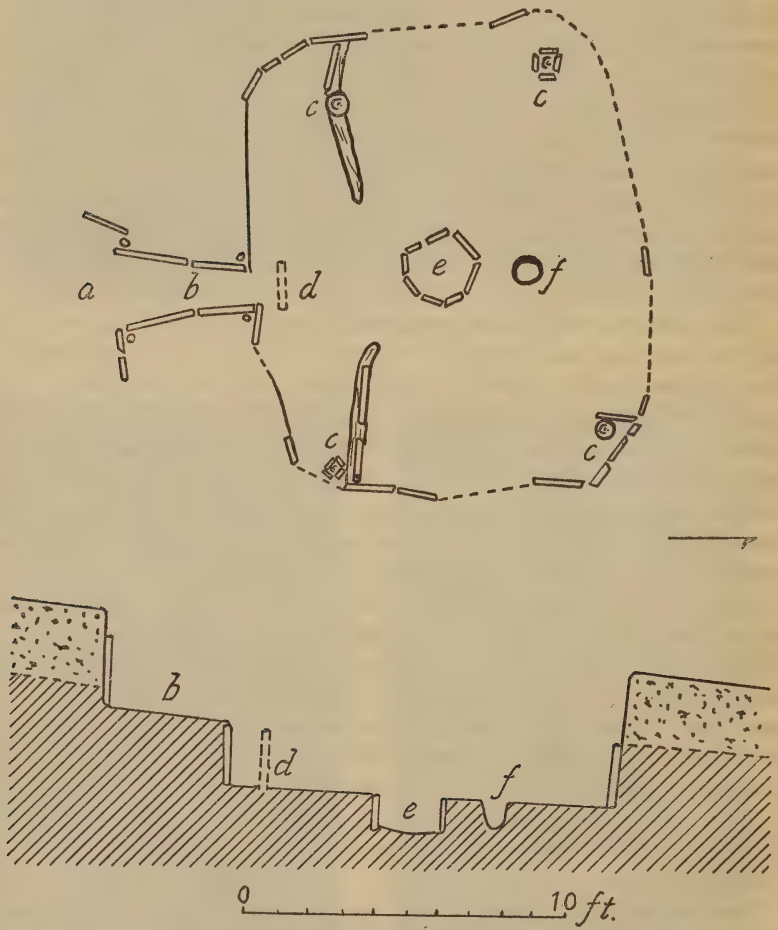


FIG. 5.—Plan of House D. *a*, Antechamber remains. *b*, Passage. *c*, Support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu

HOUSE D

House D, like house A, had been fairly rectangular in form and showed much in common with the first structure described. (Pl. 4, *b*; fig. 5.) The excavation had been lined with large stone slabs and the superstructure had been supported on four posts set in the floor near the corners of the room. In this dwelling, however, the corner

posts were not as far from the wall as in house A, a fact which is of no great importance in this instance. The post at the southwest corner was incorporated in the wall which formed the compartment on the southern side of the room. This appears to have been a rather common practice, as many of the structures showed that the low cross wall was so constructed as to include the support posts on that side of the room. At the northeast corner a slab projecting from the wall suggested that there had been a bin inclosing the post there located. This feature is reminiscent of the inclosed corner in house A, where a low adobe ridge was used instead of stone.

There was a roughly circular fire pit in the center of the room. It had been lined with small stone slabs which were covered with plaster. North of this fire pit was the sipapu. It occupied a position very similar to those noted in the previously described houses. The binlike compartment on the southern side of the room had been formed by the use of upright slabs covered with plaster. The central opening in the cross wall was much larger in this dwelling. In the portion of the compartment at the eastern side of the room a large metate was in place. This suggested that the inclosure may have been used as the family milling place.

Originally there was a deflector slab in front of the doorway into the passage, but it had fallen, and when the room was excavated it was found lying flat on the floor in front of the opening. The impression in the plastered floor showed clearly where it had been placed.

The floor of the passage in house D was somewhat higher than that of the room. A complete antechamber was not found at the outer end but there was evidence that there had been one. It had differed from the antechamber of house A, however, in that its floor level was the same as that of the passage. Apparently there had been no excavation. Judging from what remains there were of the antechamber it had been considerably smaller than the one at house A.

Four posts placed at the corners where the side walls met the walls of the room and the antechamber had supported the covering for the passage. Portions of these posts still remained at the time of excavation. These posts had undoubtedly had forked tops and carried the long beams which supported the smaller cross poles of the roof and sides of the passage. The sides had been formed in part of upright slabs. There were two of these slabs on each side of the passage.

House D measured 12 feet by 14 feet 6 inches (3.6576 m. by 4.4196 m.). The wall on the north side was 2 feet (60.96 cm.) high and that on the south 3 feet (91.44 cm.). The cross walls averaged 2 feet

(60.96 cm.) in height and the opening in the center was 4 feet 4 inches (1.3208 m.) across. The cross walls at their interior ends were 3 feet 6 inches and 3 feet (1.0668 m. and 91.44 cm.) from the wall of the room.

The doorway to the passage measured 1 foot (30.48 cm.) in width and the slabs forming the side walls of the passage rose to a height of 1 foot 6 inches (45.72 cm.) above its sill. The latter was 1 foot 10 inches (55.88 cm.) above the floor of the room. The passage was 4 feet 6 inches (1.3716 m.) in length. At its outer end the passage widened to some extent and measured 1 foot 10 inches (55.88 cm.) across.

The fire pit averaged 2 feet (60.96 cm.) in diameter and was 1 foot (30.48 cm.) in depth. The sipapu was 1 foot (30.48 cm.) from the fire pit and measured 8 inches (20.32 cm.) in diameter. It was slightly deeper than most of them, as its bottom was 10 inches (25.4 cm.) below the floor level.

The deflector slab had stood about 10 inches (25.4 cm.) from the doorway. Judging from the stone itself, the top of the deflector must have been on about the same level as the sill of the doorway into the passage. The slab was 1 foot 6 inches (45.72 cm.) wide and 1 foot 10 inches (55.88 cm.) long.

Judging from the holes, the support posts seemed to have averaged about 6 inches (15.24 cm.) in diameter and to have been set at a depth of 2 feet 6 inches (76.2 cm.).

House E

Very little remained of house E beyond the excavation, fire pit, postholes, and deflector slab. (Fig. 6.) Almost all of the stone slabs which had lined the interior of the excavated portion of the dwelling had been removed. As in the case of house B, the remains of house E suggested that it had been abandoned and dismantled prior to the final desertion of the entire village.

The circular form was more closely approached in house E than in any of the structures described in preceding paragraphs. The four support posts were quite closely oriented to the cardinal directions. The circular fire pit had a raised rim of plaster around it. This feature was observed in a number of the houses and is one which is found quite frequently in structures of the Late Basket Maker period.

The raised rim around the fire pit was generally a continuation of the ridge of plaster in which the slabs forming the compartment on the southeastern side of the room were set. In this particular dwelling these slabs had been removed, but the impressions made when they were placed in position in the ridge were quite evident.

These radiating ridges of adobe are not an uncommon feature in the construction of the houses of the period. They seem to vary in the region to the west, however, in that poles were buried in the floor, the adobe being applied to their upper surfaces and the ridges formed in that way. Where that was done no upright slabs were used to form bins or a true compartment at that side of the room. A good example of the use of logs in such a fashion is to be found in

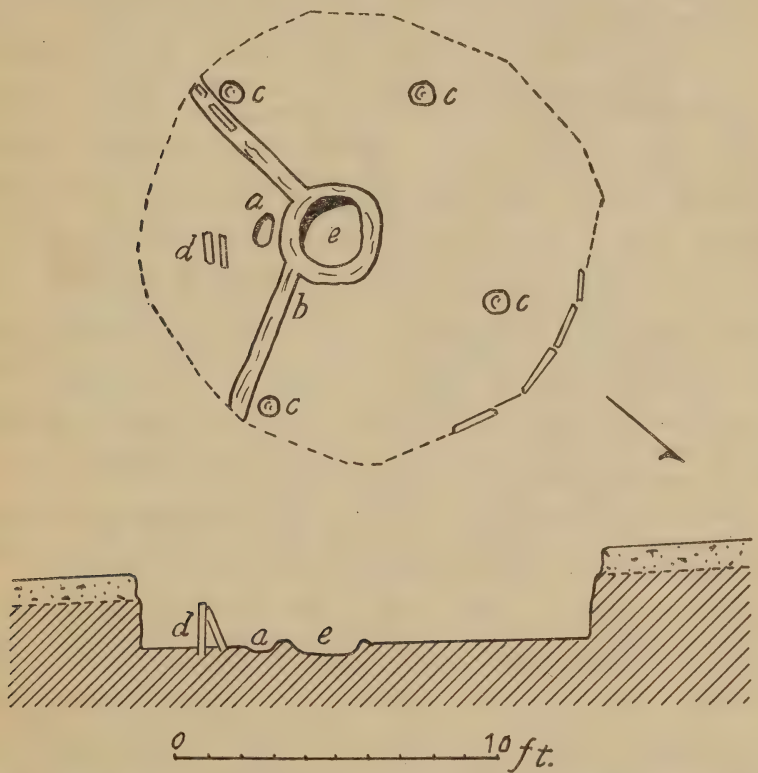


FIG. 6.—Plan of House E. *a*, Oval depression in floor. *b*, Adobe ridge. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit

a structure located in cave 5, Cottonwood Canyon, Utah, which was excavated by Mr. N. M. Judd.[26]

There were no indications of an entrance on the southeast side of house E. This portion of the ruin was on a rather steep slope of the mesa top, where it was subject to the erosive action of considerable drainage water and what might have remained at the time the house was dismantled could easily have been washed away.

[26] Judd, Archeological Observations, p. 113; also fig. 29.

The deflector slab, which was braced by a second stone, was still in position in the space between the fire pit and the side of the room where such an entrance would have been.

Between the deflector slab and the fire pit was a slight oval-shaped depression in the floor. Similar depressions were noted in other houses. Just what it was for is not clear. The most logical explanation is that the foot of a ladder rested in it. As suggested in a preceding paragraph, the smoke hole at the top of the superstructure was possibly used on occasions as an entrance, and when such was the case a form of ladder would have been essential. A depression of the type under consideration would have prevented the ladder from slipping on the smooth surface of the plastered floor. One argument against such a belief, however, is that in some of the kivas of the Pueblo periods the ladders have been found crossing to the opposite side of the fire pit. Where this was true the sipapu was at a greater distance from the fire pit and the ladder did not interfere with it. If in the case of the houses in Shabik'eshchee village the ladder had rested on the floor at the north side of the fire pit, it would have been a hindrance to the performance of any ceremonies connected with the sipapu, provided that is what the circular hole north of the fire pit was used for. It is all pure conjecture, but it seems more logical to suppose that the depression between the deflector and the fire pit was for the base of the ladder than to try to explain it on the basis of a ceremonial or other utilitarian function.

The floor on the north side of the fire pit was so damaged that it was impossible to determine the limits of the sipapu. There were indications that one had been present, but its rim was missing.

The excavation for house E was 14 feet (4.2672 m.) in diameter. When the slabs which had lined it were in place it was somewhat smaller. The few which were in position along the northern arc averaged 2 feet (60.96 cm.) in height. All of the stones had been removed on the south side, where the earth wall rose but 1 foot 6 inches (45.72 cm.) above the floor level. There was every indication that a considerable portion of the wall had been washed away. The circular fire pit was 2 feet (60.96 cm.) in diameter and 5 inches (12.7 cm.) deep. Its raised rim was 2 inches (5.08 cm.) above the floor and was 6 inches (15.24 cm.) thick on an average. The support posts seem to have averaged 8 inches (20.32 cm.) in diameter and were set at a depth of a little over 2 feet (60.96 cm.).

House F

One of the most interesting problems encountered during the excavations was in connection with house F. It was found that a smaller structure had been erected inside of a much larger one and

that the former had incorporated but a small portion of the latter in its construction. (Fig. 7.) Indications were that the older dwelling, the larger one, had been partially burned and that subsequent to the fire the smaller one had been built inside of it. This secondary construction saved the laborious effort which a new excavation would have entailed.

The smaller, more recent dwelling was the first one to be discovered, and it was only after it had been completely cleared of débris that suggestions of another structure having occupied the site

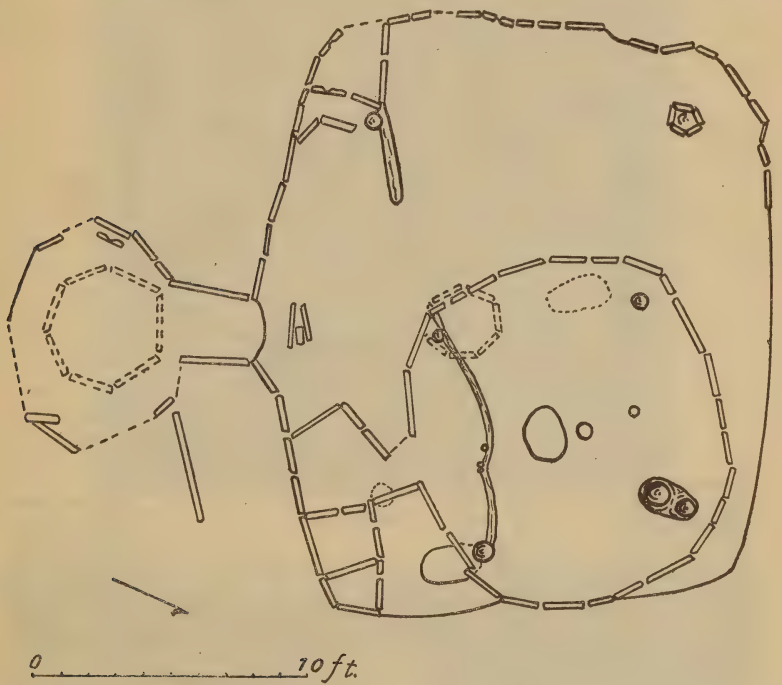


FIG. 7.—Plan of the F House group, showing both structures in complete relationship

were noted. To simplify discussion the houses will be described in the order in which they were uncovered. Both were as fine examples of the house type of the period as could be desired. The smaller of the two will be referred to as house F, while the larger will carry the designation of house F–1.

The subterranean portions of the walls of house F were constructed entirely of stone slabs. (Fig. 8.) These had been covered with a coating of plaster. It was again found that the superstructure had been supported on four posts. The two on the entrance side of the room had been incorporated in the partition which formed the compartment about the doorway. The post near the southern corner

had been placed in the fire pit of the original house occupying the location, and for that reason had been more thoroughly braced with stones than was generally found to be the practice.

It had not been necessary to line the fire pit with stone because it had been pecked out of the mesa top cap rock. The pit was oval in shape and, like the one in house C, had been finished with a coating of plaster over the rock. Close to the fire pit was the small circular

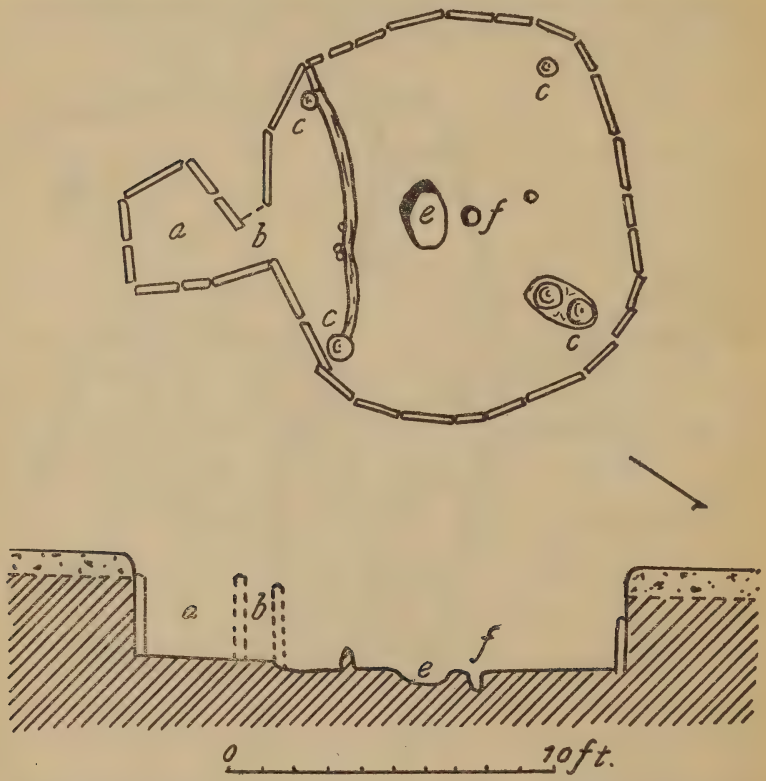


FIG. 8.—Plan of House F. *a*, Antechamber. *b*, Passage. *c*, Support-post holes. *e*, Fire pit. *f*, Sipapu

hole which has been likened to the sipapu. The latter also was cut into the living rock. (Pl. 4, *a*.)

At some distance from the so-called sipapu, between it and the wall on that side of the room, was another circular hole, smaller in size. An explanation for the second hole is not readily forthcoming. The same feature was found in one or two additional structures. There was another circular hole, probably a place for the storing of small articles, in the floor in front of the north support post for the roof.

a, Sipapu in floor of House F

b, House D

HOUSE REMAINS]

a, House F–1 during excavation. Rough masonry may be noted at sides of doorway. House F in left foreground

b, House H

HOUSE REMAINS

The compartment on the southeastern side of the room was somewhat different from those previously described. In house F the partition was continuous. It did not have the break or doorway in the center opposite the entrance to the passage. The necessity for such an opening was removed by the manner in which the cross wall had been constructed. At each end where it joined the walls of the room there was the usual upright stone slab the same height as the main wall. Between these slabs the wall was considerably lower, so much so, in fact, that a person could have stepped over it with ease. In addition to this the deflector had been incorporated into the partition. It stood in its proper position between the entrance doorway and the fire pit.

The deflector differed, also. Instead of being a stone slab, as in the other houses, it was of pole and plaster construction. Two small poles had been placed upright in the low cross wall and the space between them was filled with adobe mortar. Indications in the débris of the room were that the top of the deflector had been at about the same height above the floor as the slabs on either side of the doorway into the passage.

The rather short passage opened into an antechamber which was somewhat rectangular in form. The latter shape was more or less imposed upon the builders by certain features in the earlier house. The outer wall of the antechamber, the one opposite the passage, was formed by the wall of the older house. The side of the antechamber toward the northeast was formed by slabs which had been set in the compartment of the older house, ostensibly for making a bin in that portion of the room. Because of this the size and shape of the antechamber for house F was decidedly limited. The floor of the passage was higher than the floor of the room, at the doorway, and sloped upward to the antechamber. This higher, upward-sloping floor was intentional, as it had been necessary to fill in the passage and antechamber to secure such a result. The floor level of that portion of the older house had been the same as that of the main room in house F.

On the floor level house F measured 12 feet 6 inches by 11 feet (3.81 by 3.3528 m.). On the side opposite the doorway the slab wall was 1 foot 7 inches (48.26 cm.) high and at the entrance to the passage it was 3 feet (91.44 cm.) from the floor level to the tops of the slabs.

The cross wall of adobe plaster which formed the compartment on the entrance side averaged 8 inches (20.32 cm.) high, between the upright slabs at its ends, and 3 inches (7.62 cm.) wide. As mentioned previously, the height of the deflector was probably about the same as that of the slabs on that side of the room. There is no definite information, however, on that point.

The doorway into the passage was 1 foot 6 inches (45.72 cm.) wide. The floor of the passage was 4 inches (10.16 cm.) higher than that of the room, making a slight step at the doorway. The passage was 1 foot (30.48 cm.) long and the antechamber measured 3 feet (91.44 cm.) by 2 feet (60.96 cm.) on an average. Because of the irregular shape of the latter the measurements are somewhat variable. The floor of the antechamber was 2 feet 8 inches (81.28 cm.) beneath the old ground level.

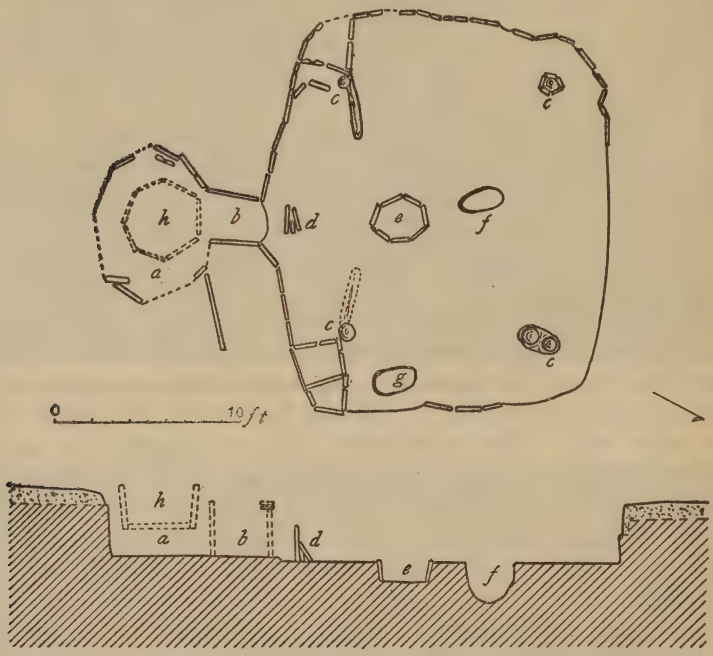


FIG. 9.—Plan of House F–1. *a*, Antechamber. *b*, Passage. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit. *f*, Oval hole in position normally occupied by sipapu. *g*, Second fire pit. *h*, Fire pit placed in antechamber at date subsequent to abandonment of house

The fire pit in the room measured 2 feet by 1 foot 6 inches (60.96 by 45.72 cm.) on two diameters and had a depth of 6 inches (15.24 cm.). The sipapu was 7 inches (17.78 cm.) in diameter and 7 inches (17.78 cm.) deep. It was 4 inches (10.16 cm.) from the fire pit. The smaller hole was 1 foot 5 inches (43.18 cm.) from the sipapu and was 5 inches (12.7 cm.) in diameter. It was 3 inches (7.62 cm.) in depth. The holes for the support posts averaged 10 inches (25.4 cm.) in diameter and had an average depth of 2 feet 6 inches (76.2 cm.).

House F–1 differed little in its general aspects from the smaller structure which had been erected within its confines or from the other houses described. It was one of the largest excavated. The

walls of the pit were only partially lined with stone slabs. The greater part of the north wall and portions of the eastern one were simply plaster. (Fig. 9.)

The septilateral fire pit in the center of the room had been lined with small stone slabs the tops of which were flush with the floor. The large oval-shaped pit in the floor near the fireplace occupied the position which the sipapu ordinarily did. Perhaps it served the same function, in spite of its greater size. No excavation had been made for this pit. Instead, the housebuilders had taken advantage of a crack in the cap rock of the mesa. The crack itself was much larger than the finished pit but had been filled in partially with stone spalls and adobe mortar. The walls of the pit had been plastered carefully and it would have made an ideal storage place. It had been within the confines of house F also, but it had been filled with large stones and earth and the floor of the later house extended over it. The same was true of the rather shallow, oval pit near the bin at the eastern corner. The latter pit gave every evidence, however, of having been used as a fireplace.

The compartment at the southeast side of the room had been more elaborate than in many of the houses. The usual row of partition slabs had been set in the floor, but in addition to these other stones had been used to make small bins in the compartment. Part of this partition had been removed to make way for the later house, and as a result a portion of the east cross wall was missing. Its former presence could be traced in the grooves which it left in the floor. The latter indicated how far it had extended into the room. On the west side the support post for the superstructure had been incorporated into the cross wall but on the east side the post had only been partially inclosed. As in so many of the houses, the other two posts were inclosed in small stone boxes formed of slabs whose tops were flush with the floor level.

The wall of house F–1 on the side where the doorway opened into the passage was interesting because it had some masonry, albeit of a crude sort, on top of the slabs. This feature was the same as noted in the construction of house A. Its prime purpose seems to have been that of leveling the wall near the doorway. Some of the slabs which were used in that portion of the wall were not as high as the majority and it was necessary to add to them. This was done through the use of the horizontally laid stones in a crude form of masonry. The fact that this was done at the doorway might be considered as indicating a desire for a little better finish to the wall near that opening. The character of this masonry is clearly shown in the photograph taken at the time the ruin was being excavated. (Pl. 5, *a*.)

The entrance to the passageway was larger than in the smaller, later house. There was a slight step and the floor of the passage had a gentle upward slope toward the antechamber. The deflector between the doorway and the fire pit was quite large, and because of its size and the fact that the floor of the house was on the cap rock of the mesa it had been necessary to brace it with other stones. These were placed on the side toward the fire pit and with the adobe plaster served to keep the deflector in an upright position.

The antechamber of house F–1 had been quite large, although not as large as the one of house A. It was not intact at the time of excavation, however, as some of the slabs which had lined the pit had been removed. Their imprints were still to be seen in the earth walls, and there is no question that the entire excavation had been so lined. The large slab projecting from the east side of the antechamber seemed to have been of a later date than the main portion of the structure. It stood considerably higher than the slabs which lined the antechamber pit and its base was well above the floor of the latter. It probably had been associated with a fire pit which had been placed in the antechamber at a date subsequent to its abandonment. This fire pit, like the cist described in connection with house B, had its floor at a much higher level than that of the antechamber. The space between was filled with débris such as is wont to accumulate around an Indian village. It was in large part house sweepings, ashes, sand, containing bits of broken bones, and a few potsherds. It is quite possible that this fire pit was used by the occupants of the later house, F.

On the east side of the fire pit, at about the same level as its bottom, was a burial. The body had been placed close to the pit and was within the confines of the old antechamber. Advantage was no doubt taken of the ease with which a grave could be dug in the débris which had accumulated in such a place. Excavations in the soil which topped the mesa must have been quite difficult with the crude implements with which the people had to work. Consequently, wherever possible, they seem to have deposited the bodies of their dead in accumulations of refuse.

At the west side of the antechamber there was a feature which was quite suggestive of the antechamber in house A. An old, worn-out metate or milling stone had been set on end in the floor in about the same position as the large slab noted in the house A entryway. It was much smaller, however, than the one in the latter. Such a stone would be of considerable assistance to a person stepping down into the antechamber or stepping up to the ground level when leaving it. The position of the stone would suggest that here, as in the first house discussed, the door to the antechamber had not been on a

direct line with the passage but was at one side, a feature which would have had distinct advantages from several points of view. From the present evidence, however, it can only be suggested that in the case of the two antechambers, those of houses A and F–1, the entrance to the chamber may have been at one side rather than directly in front of the passage into the main room of the structure.

The break in the southern wall of the antechamber is quite suggestive of a doorway, but there was nothing to indicate that such an opening had been present. The slab at the east side was in a position which might be considered indicative of a jamb, but other factors favor the belief that this break in the wall of the pit was due to the removal of slabs from that point rather than to its having been an entrance to the antechamber.

House F–1 had been the largest domicile in the entire village. It measured, on the floor level, 21 by 18 feet (6.4008 by 5.4864 m.). The wall on the northwest side averaged 1 foot 6 inches (45.72 cm.) in height and on the southeastern side of the room, from corner box to corner box, it was 3 feet 6 inches (1.0668 m.) in height. Near the center the upright slabs were 3 feet (91.44 cm.) high and the crude masonry extended 6 inches (15.24 cm.) above their tops.

The fire box measured 2 feet 10 inches (86.36 cm.) by 2 feet (60.96 cm.) and was 1 foot (30.48 cm.) in depth. The oval pit in the floor, north of the fire pit, was 2 feet 6 inches (76.2 cm.) long and 1 foot (30.48 cm.) wide. Its rounded bottom was 2 feet (60.96 cm.) below the floor level.

The oval fire box near the eastern corner of the room measured 3 feet (91.44 cm.) the long way and 1 foot (30.48 cm.) in width. It was 10 inches (25.4 cm.) deep. On an average it was 1 foot (30.48 cm.) from the wall of the room and 1 foot 2½ inches (36.83 cm.) from the corner box.

At the southeastern corner the bin was 4 feet 4 inches (1.3208 m.) in length and 2 feet 6 inches (76.2 cm.) wide. It had been divided into two compartments by the use of an additional slab. One of these compartments was approximately twice as large as the other. The traces of the partition wall, in the floor, showed that it had extended into the room 3 feet (91.44 cm.) from the corner of the storage bin. This made a total length of 7 feet 4 inches (2.2352 m.) for the compartment wall on that side of the room. The open space between the end of this wall and that on the opposite side was 7 feet 6 inches (2.286 m.).

The partition wall on the west side of the room was 6 feet 6 inches (1.9812 m.) long. A small bin had been formed in the corner by setting two slabs of stone, one an old metate, across the inclosure, 3 feet (91.44 cm.) from the west wall of the room.

The deflector slabs stood 10 inches (25.4 cm.) from the doorway into the passage. The main slab was 2 feet (60.96 cm.) high and 1 foot 6 inches (45.72 cm.) wide. It averaged 2 inches (5.08 cm.) in thickness.

The doorway into the passage was 2 feet (60.96 cm.) wide. The passage was 3 feet (91.44 cm.) long on the east side and 3 feet 6 inches (1.0668 m.) along the west wall. The passage widened where it opened into the antechamber, measuring 2 feet 6 inches (76.2 cm.) from wall to wall. The floor of the passage was 3 inches (7.62 cm.) above the floor of the room at the doorway and sloped slightly upward to the floor of the antechamber. The latter was 8 feet 6 inches (2.5908 m.) in diameter on its long axis and 6 feet (1.8288 m.) on the short. The floor of the antechamber was about 4 inches (10.16 cm.) higher than that of the house. The slabs which were still in position rose to a height of 3 feet (91.44 cm.) above the floor level.

The fire pit, which had been placed in the antechamber at some date subsequent to its abandonment, was roughly circular in form. It had an average diameter of 4 feet (1.2192 m.). The bottom of this pit was 1 foot 6 inches (45.72 cm.) above the floor of the antechamber.

With the exception of a few features, the two houses had very little in common. Both had had the same floor. Three slabs in the east wall of the old house had been incorporated into the newer structure. The same hole had been used for the northeast support post in each house. A portion of the bin in the southeast corner of the older building had formed one side of the antechamber of the smaller domicile. Another side of the antechamber consisted of two slabs in the wall of the larger dwelling. Beyond these features, however, the buildings had been separate structures.

House G

This structure was very similar in its general aspects to the others in the village. (Fig. 10.) It was somewhat smaller than some of those already described but in all respects had been a characteristic domicile. The excavation had been lined with the customary stone slabs, although at the time of excavation a number of them were missing. Some of them had fallen in and were lying on the floor of the room while others had been completely removed. Here again, perhaps, material had been removed from a dwelling no longer occupied for use in other constructions.

An interesting feature associated with the apparent abandonment of house G was the finding of quite definite indications that the antechamber had been worked over to a certain extent to serve as a storage

bin. This was the only example of such a procedure found in the entire community.

In the main room the various features indicated that the usual support posts had been used to carry the superstructure. The four holes near the corners still retained portions of those posts in the form of fragments of decayed wood. The sipapu was observed in its customary position near the fire pit. The fire pit was somewhat more irregular in shape than those which have been described for the other houses. It had been lined with small stone slabs, the tops of

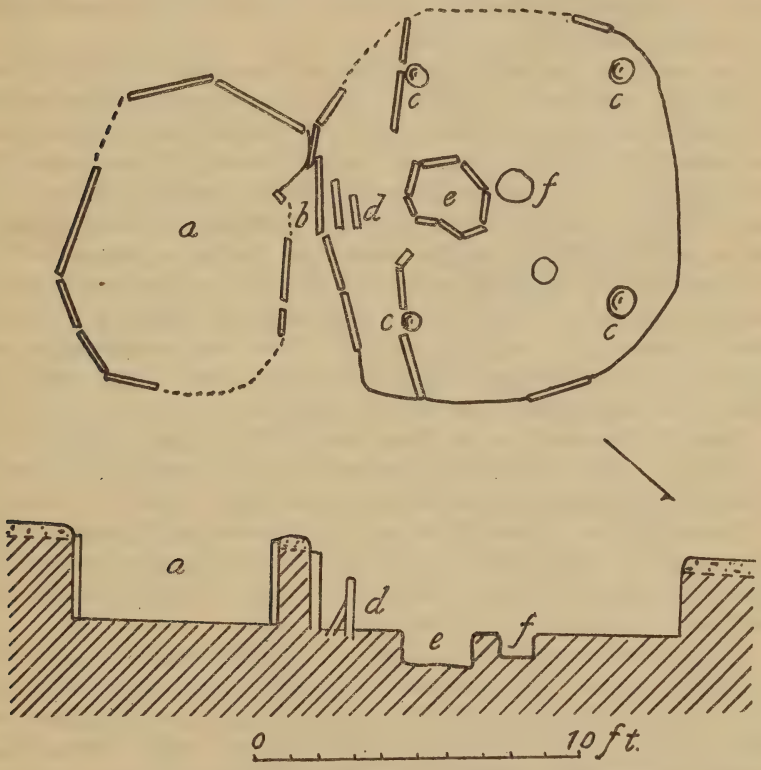


FIG. 10.—Plan of House G. *a*, Antechamber. *b*, Possible short passage. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu

which were flush with the plastered floor, and had been paved with the same material. The pit was much closer to the opening in the cross wall forming the compartment on the southeast side of the room than those in the other structures. In fact the rim on the passageway side of the pit was almost on a line with the two ends of the slab partition. The deflector consisted of two slabs, one having been placed in such a position as to support the other.

The passage between the main room and the antechamber had been very short. It also seems to have been on the ground level. The

floor level of the antechamber was slightly higher than that of the main room and it would have been possible, without a great deal of inconvenience, to step over the higher section in passing from one room to the other.

The antechamber had been quite large, almost as large as the one for house A, and was closer to the main portion of the dwelling than in most cases. There was clear evidence that the doorway to the passage had been blocked up or filled in. This suggested the belief that the antechamber may have been used as a storage bin after the house was no longer occupied. The débris filling the two excavations was totally different in character.

The house portion of the structure had been filled in with refuse of the type commonly found in dump heaps, while the antechamber pit contained clean, wind-blown sand. The latter would suggest that the antechamber had been in use down to the end of the occupation of the village. If the antechamber had been abandoned prior to the desertion of the village, it too would have contained débris of accumulation such as always collects around an Indian settlement. The modern Pueblo Indians are quick to throw their refuse into rooms no longer used, and it is quite likely that the early communal dwellers were followers of a similar practice. There was considerable carbonized corn on the floor of the antechamber, which was good evidence of its having been used as a storage place.

House G measured, on the floor level, 11 by 12 feet (3.3528 m. by 3.6576 m.). The wall on the northwestern side was 2 feet 6 inches (76.2 cm.) high and on the southeast it was 3 feet (91.44 cm.) high.

The sipapu was 1 foot (30.48 cm.) in diameter and 6 inches (15.24 cm.) deep. It was 4 inches (10.16 cm.) from the edge of the fire pit. The latter measured 2 feet 4 inches (71.12 cm.) by 2 feet (60.96 cm.) and had a depth of 1 foot (30.48 cm.).

The opening between the ends of the compartment walls was 4 feet (1.2192 m.) wide. The inner end of the south wall was 2 feet (60.96 cm.) from the main wall of the room and that of the north partition was 1 foot 10 inches (55.88 cm.) from the same wall. The average height of these walls was 2 feet 6 inches (76.2 cm.).

The main deflector slab was 10 inches (25.4 cm.) from the wall of the room. The base of the bracing slab was 5 inches (12.7 cm.) from the wall. The deflector was 1 foot 6 inches (45.72 cm.) wide and 1 foot 6 inches (45.72 cm.) high.

The passage seemed to have been about 1 foot (30.48 cm.) long. Its width could not be determined correctly. It must have been approximately 2 feet (60.96 cm.), however.

The antechamber measured 8 feet 6 inches (2.5908 m.) by 7 feet (2.1336 m.). Its average depth was 2 feet 6 inches (76.2 cm.).

Three of the support posts averaged 9 inches (22.86 cm.) in diameter, and the fourth one was 6 inches (15.24 cm.) across. The average depth to which they had been sunk in the floor was 2 feet (60.96 cm.).

House H

There were certain individual characteristics in house H, but they were of such a nature that the general aspects of the dwellings coincided quite closely with those of the other structures. (Pl. 5, *b;* fig. 11.) Stone slabs had been used to face the entire periphery of the excavation. The superstructure had been supported on four upright posts, there was a sipapu, the usual fire pit near the center of the room, and there had been a compartment on the southeast side.

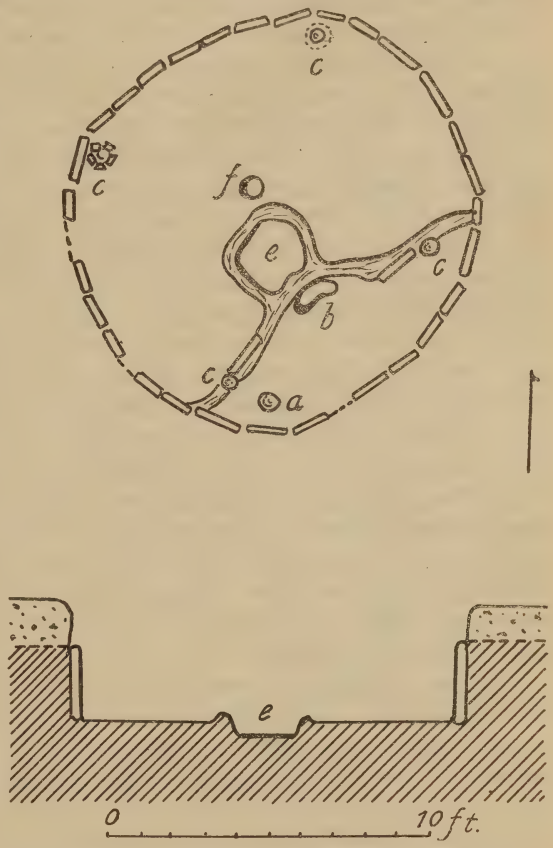


FIG. 11.—Plan of House H. *a*, Storage hole in floor. *b*, Oval depression in floor for end of ladder. *c*, Holes for support posts. *e*, Fire pit. *f*, Sipapu

House H differed from those previously described in having had no deflector. Furthermore, there was no indication in the plaster on the floor that there ever had been one. In addition to this, no traces could be found of an entryway or passage on the southeast side. This is not definite proof, however, that one never existed. In view of the fact that so many of the houses had had such a feature in their construction it seems more in keeping with the characteristic house type to believe that house H had an entryway. Had it been constructed wholly of perishable materials and on the ground level all traces of it could easily have been obliterated during

the centuries which must have passed since the village was deserted. On the other hand, it would be more interesting to believe that it had not had the usual entrance and that access to the interior had been possible only by means of a ladder extending through the smoke hole at the top of the superstructure. If the latter were true, house H would be an example of the step which was made when the old side entrance was abandoned and the only entrance to the house was through the roof, an outstanding feature in the rectangular above-ground dwellings of the earlier Pueblo periods which followed. Certain evidence suggested the belief that house H was one of the late structures in the village and it is quite possible that there is to be observed in it one of the stages in the transition from the typical Late Basket Maker structure to those of the early Pueblo period.

The sipapu and fire pit were cut into the cap rock of the mesa and had been plastered when the adobe had been applied to the surface of the floor. The fire pit had a raised rim of plaster. The latter was a continuation of the ridge into which the slabs of stone forming the compartment on the southeast side had been set.

In the floor at the southeast side of the fire pit was an oval depression similar to that in house E, which may have been the place where the lower end of the entrance ladder was placed. Some such provision would have been necessary here, as well as in the preceding house, to keep the ladder from slipping on the smooth surface of the floor. Inasmuch as the cap rock served as the floor it would have been rather difficult to embed the foot of the ladder in the floor, as was frequently done in houses of a later period. An oval depression would serve the purpose and would be much easier to make than a slanting hole in the stone. The plaster which covered the rock was somewhat broken and roughened on the side of the depression where a ladder could have rested.

The slabs forming the eastern end of the compartment wall had been broken off. The same was true of one of the slabs near the western end. The southern support post for the roof had been incorporated in the partition wall but the eastern post had not. The latter stood against the low cross wall, inside of the compartment. There was a small circular hole, well plastered, in the floor at the southwestern end of the compartment. It had probably been used for storage purposes.

The base of the northern supporting post in this structure showed an interesting treatment. It had been surrounded by a small raised ring of plaster. This same feature was observed in house K, where it was also a north post which had been so treated. None of the other posts gave any evidence of having had this ring of plaster at the base. Its usefulness as a brace and support for the post is readily

apparent, but why it should have been applied only to the post at the north side of the house is not. There may have been some special significance attached to it or it may have been just an individual peculiarity so expressed in the construction of the two houses in which it was found.

House H measured 12 feet 6 inches (3.81 m.) by 11 feet 6 inches (3.5052 m.) on the floor level. There was no marked variation in the wall height. On the north side the wall was 2 feet 6 inches (76.2 cm.) high. The south side, which in a majority of the houses was higher than the north, measured the same, 2 feet 6 inches (76.2 cm.).

The sipapu was 8½ inches (21.59 cm.) in diameter and 6 inches (15.24 cm.) in depth. It was 6 inches (15.24 cm.) from the fire pit. The latter was more heart-shaped than circular, but its greatest diameter on two axes was 2 feet (60.96 cm.). Its depth was 6 inches (15.24 cm.). The raised rim around the pit was quite damaged, but it was possible to ascertain that it had been 4 inches (10.16 cm.) in width and approximately the same height. The oval depression on the southeast side of the fire pit was 1 foot 4 inches (40.46 cm.) long and 6 inches (15.24 cm.) wide. It was quite shallow, as its greatest depth was but 3 inches (7.62 cm.).

The opening in the cross wall was 4 feet (1.2192 m.) wide. The eastern part of the partition forming the compartment had been 3 feet 6 inches (1.0668 m.) long and the western part measured 3 feet (91.44 cm.). The single slab standing in the partition was 1 foot 5 inches (43.18 cm.) high. The partition wall had been slightly higher, however, as the plaster which had covered the slabs rose several inches above the tops of the stones. The inside end of the eastern section of the partition was 2 feet 6 inches (76.2 cm.) from the southeastern wall of the room. The inside end of the partition on the west measured 2 feet 10 inches (86.36 cm.) from the wall of the room. The hole in the floor at the western end of the compartment was 8½ inches (21.59 cm.) in diameter and 7 inches (17.78 cm.) in depth.

The holes for the supporting posts averaged 6 inches (15.24 cm.) in diameter and were about 2 feet (60.96 cm.) deep.

House I

This structure showed greater variation from the general house type than any other in the village. Most of the features which might be considered as common were missing, and the general plan was quite simple. (Fig. 12.) The earth walls of the excavation, which were roughly circular in form, had been treated with a coat of adobe plaster. No slabs had been used in the construction of the lower portion of the house. The superstructure had been supported on four posts, as in the other domiciles. The fire pit was circular in

form and lined with plaster. No stones were used to line its interior. There was no indication in the floor of a sipapu. The compartment-like inclosure found on the southeastern side of so many of the rooms was absent in this dwelling, and there were no indications that there had ever been one. There was no deflector, and no trace whatsoever could be found of an entryway or passage.

An interesting feature of this house was the storage bin or recess at the western side of the room. Its form is readily determined from the profile view of the ruin shown in Figure 12. At the ground level the horizontal outline of the structure was that of a circle, although a rather crudely shaped one. The recess had been cut out of the earth wall in such a way that it was roughly dome-shaped. Plaster had been applied to the sides and top of this excavation, and a very good storage place thus obtained. At the center of the opening into this recess was a circular depression in the floor which also could have served for storage purposes. This was the only house in the entire village which showed such a recess. Wall niches on the floor level are not unknown, however. Mr. Morris found them in structures of the semisubterranean type 70 miles east of La Plata River in southern Colorado,[27] but in the latter the bottoms of the bins were slightly below the floor level. Doctor Kidder and Mr. Guernsey found a wall niche on the floor level in a structure which they excavated in part in White Dog Cave in northeastern Arizona.[28]

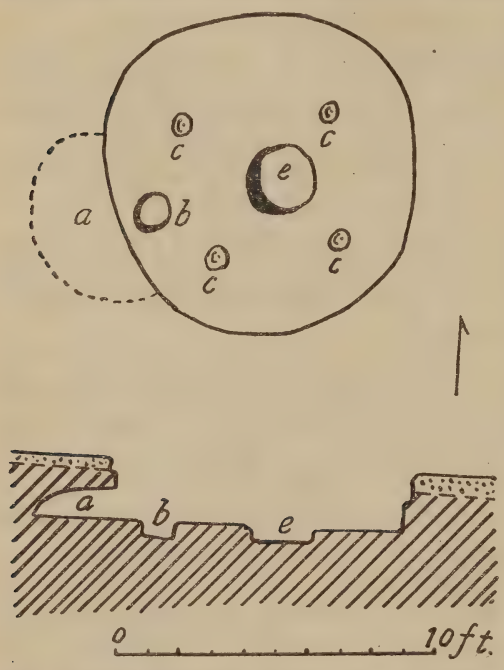


FIG. 12.—Plan of House I. *a*, Wall recess. *b*, Storage pit in floor. *c*, Support-post holes. *e*, Fire pit

House I varied slightly in diameter. On an east-and-west line it measured 9 feet 8½ inches (2.9591 m.) and on the north-south diameter 9 feet 6 inches (2.8956 m.).

[27] Morris, Preliminary Account of Antiquities Between the Mancos and La Plata Rivers, p. 186.

[28] Guernsey and Kidder, Basket-Maker Caves, p. 25, fig. 7 b.

There was some variation in wall height. On the east side of the room the plaster rose to a height of 1 foot 1½ inches (34.29 cm.) above the floor, and on the west, where the recess was located, it measured 1 foot 6 inches (45.72 cm.) in height. This variation was no doubt due to the fact that there was quite a slope to the hill at that point, and in order to secure a floor which was fairly level the excavation would have had to be somewhat deeper on the western side. From the top of the recess to the top of the wall, at the center of the recess, was 6 inches (15.24 cm.).

The recess, on the floor level, measured 5 feet (1.524 m.) on its long axis. The back wall of the recess was 3 feet (91.44 cm.) from a line connecting the two sides of the opening into the room. The latter measured 4 feet 9 inches (1.4478 m.) at the point of its greatest width.

The circular hole in the floor in front of the opening into the recess was 1 foot 2½ inches (36.83 cm.) in diameter and had a depth of 6 inches (15.24 cm.). The eastern edge of this pit was 2 feet 6 inches (76.2 cm.) from the western edge of the fire pit. The latter was 2 feet (60.96 cm.) in diameter and had an average depth of 4 inches (10.16 cm.).

Because of the small size of the structure large support posts for the superstructure were not necessary, and judging from the size of the holes in which they were set they must have measured, on the average, about 6 inches (15.24 cm.) in diameter. The average depth of these postholes was slightly over 2 feet (60.96 cm.).

House J

House J when excavated revealed certain features which were of decided importance from the standpoint of their bearing on the type of house construction which quite frequently has been observed in the first of the Pueblo periods. (Fig. 13.) In erecting this dwelling the builders made the usual excavation, roughly oval in contour in this instance, but instead of applying the plaster directly to the native earth walls or lining the pit with stone slabs they made use of a series of upright posts, set in the floor around the periphery. These posts formed a framework for the walls, which consisted of thick adobe plaster placed between and around the posts. This is the so-called jacal type of construction which has been found in quite a few ruins of the Pueblo I phase of southwestern sedentary cultures.

The introduction of this type of wall construction apparently did away with the sloping upper portion of the walls noted in the houses which have been described in preceding paragraphs. The posts set around the sides of the excavation were probably tall enough to pro-

vide the necessary above-ground portions of the walls. With walls of this type, and a house no larger than the one under consideration, interior support posts for the roof would not be necessary. The builders of house J seem to have realized this fact, because there was no indication that such posts had been used in the structure. The roof timbers apparently were carried by the walls. There is then, in house J, what may be considered as an illustration of one of the steps which led from the old type of domicile with sloping walls and

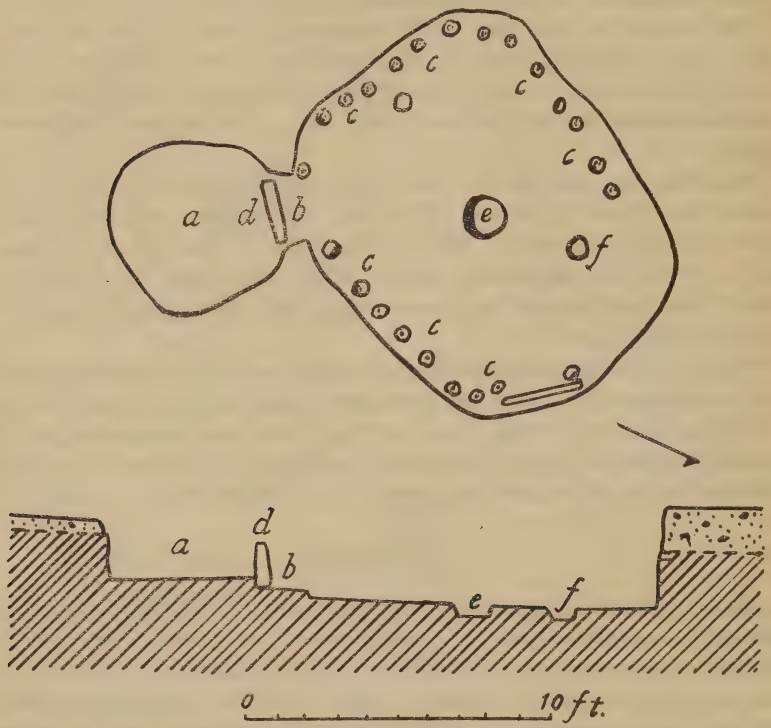


FIG. 13.—Plan of House J. *a*, Antechamber. *b*, Doorway to room. *c*, Holes for posts used in wall construction. *d*, Possible deflector. *e*, Fire pit. *f*, Sipapu

flat roof, which is so marked a characteristic of the Basket Maker III period, to one of the forms of dwellings with straight side walls and a flat roof which is found in the first Pueblo period.

Numerous examples of structures with walls of the type just described have been observed in the San Juan area. Mr. Morris found rather definite suggestions of them in the La Plata district, east of Spring Canyon, in southwestern Colorado.[29] The writer uncovered similar features in the remains of structures excavated along

[29] Morris, Antiquities of Southwestern Colorado, p. 187.

the Piedra River in the same State,[30] while Mr. Judd found a slight variation of this type of wall construction in southern Utah.[31] In the latter dwellings, however, the four central support posts were retained.

Remains of most of the posts which had formed the framework of the walls of house J were found but, due to the fact that the floor at the northern end of the room had been damaged greatly, the exact number and location of several, possibly four or five, could not be determined. Hence in the ground plan of the house they are omitted.

The sipapu was present at the north side of the fire pit, but at a somewhat greater distance from it than in most of the structures of the village. The fire pit was circular in form and was located in about the center of the room. There was no deflector or fire screen but there had been an entryway with an antechamber at the southeast corner.

It is possible that there had been in this structure, as in house C, a movable deflector, so to speak. A large stone slab was found in position across the opening to the antechamber. Perhaps it merely had been placed in position when needed and not set in the floor.

The passage from the antechamber to the main room of the dwelling was so short that it could hardly be called anything but a doorway. The floor of the antechamber was higher than that of the room and there was a slight step at the doorway. There was a second step from the sill of the doorway to the floor of the antechamber. The stone slab which has been considered as a possible deflector of the movable type was resting on the sill of the doorway and against the riser of the second low step.

The excavation for house J measured 13 feet (3.9624 m.) by 10 feet 6 inches (3.2004 m.), but the inside of the house had been somewhat smaller because of the thickness of the post and plaster walls. The inside measurements, on the floor level, were found to be 11 feet (3.3528 m.) by 8 feet 6 inches (2.5908 m.).

It was impossible to tell how high the walls had been, but from the amount of débris which filled the interior of the excavation it would seem that they must have been about 6 feet (1.8288 m.). The excavation was 2 feet (60.96 cm.) and it is fairly probable that the upper walls extended 4 feet (1.2192 m.) above the surface of the ground. The posts set around the periphery averaged about 6 inches (15.24 cm.) in diameter and the average depth to which they had been set was 1 foot 6 inches (45.72 cm.).

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[30] Roberts, Report on Archaeological Reconnaissance in Southwestern Colorado in 1923, p. 11, fig. 1.

[31] Judd, Archeological Observations, p. 71.

The sipapu was 10 inches (25.4 cm.) in diameter and 8 inches (20.32 cm.) deep. From the edge of the sipapu to the edge of the fire pit was 2 feet (60.96 cm.). The fire pit was 1 foot 6 inches (45.72 cm.) in diameter and 6 inches (15.24 cm.) deep.

The doorway to the antechamber was 2 feet 4 inches (71.12 cm.) wide. The passage, if such it may be called, was just 1 foot (30.48 cm.) in length. The step at the doorway was 2½ inches (6.35 cm.) high. The second step, that from the sill of the doorway to the floor of the antechamber, was 5 inches (12.7 cm.) high. Both steps had been cut from the earth and treated with a coating of plaster.

The antechamber measured 5 feet by 5 feet 6 inches (1.524 by 1.6764 m.). The floor of the antechamber had an almost imperceptible downward slope from this point and at the opposite wall was slightly lower than at the step. The wall was 1 foot 4 inches (40.64 cm.) high. The slab which closed the doorway measured 2 feet 6 inches (76.2 cm.) in length and was 1 foot 7½ inches (49.53 cm.) high and 2 inches (5.08 cm.) thick.

House K

Little remained of house K at the time of excavation. (Fig. 14.) This fact can be explained on the same grounds as was the similar condition of houses B and E, namely, house K gave evidence of having been dismantled after it had been abandoned. Perhaps, as was suggested in the discussion of this feature in the two other houses, the material was needed in the construction of a later dwelling, and for that purpose many of the slabs which had lined the excavation had been removed. There were clear indications around the walls of the excavation of the slabs which had been used to face it. Most of them were missing, however, when the remains of the dwelling were uncovered. Nevertheless, there was enough of the structure left to show that it had been, in a general way, quite like the others of the village.

The excavation for the main rooms of the dwelling had been more nearly oval in form than in most of the structures of the village. Its interior features were much the same as those described in preceding pages. The superstructure had been supported on four posts. There was one interesting feature associated with these posts. One of those on the north side of the room had been buttressed with a ring of adobe plaster at its base. It will be recalled that a similar treatment of a north support post was observed in house H. There was a sipapu and a fire pit and there had been a compartment on the southern side of the room. There were additional holes in the floor, which must have served in the capacity of storage boxes or receptacles for small objects.

Although most of the slabs which had formed the compartment had been removed the deflector slab was still in position. The passage leading to the antechamber was missing, however. The débris removed from this portion of the structure indicated that there had been such a passage and that, as in the case of the others described, it had been lined with stone. The latter was probably removed at the time when the other slabs were taken from the main portion of the building.

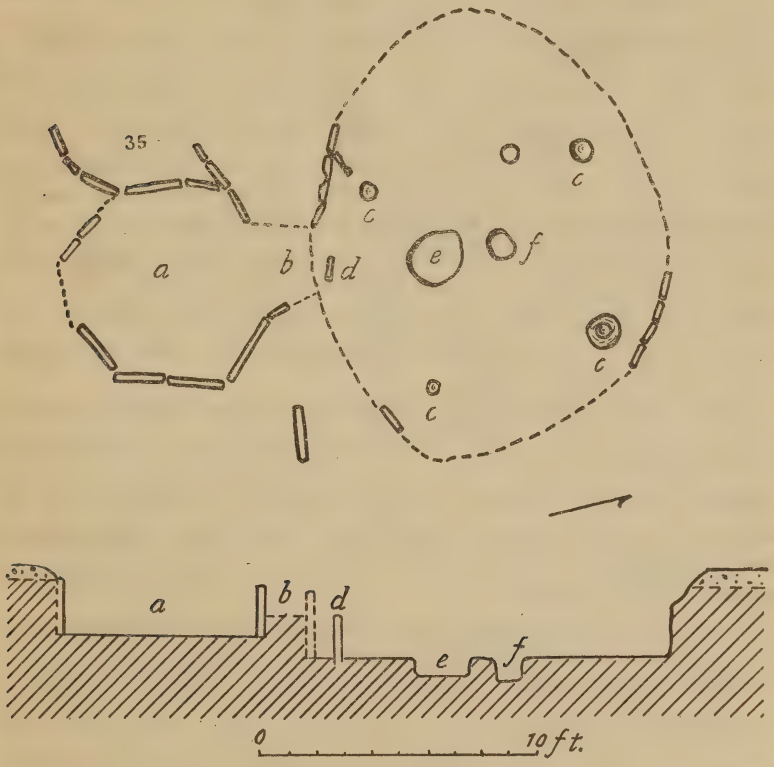


FIG. 14.—Plan of House K. *a*, Antechamber. *b*, Passage. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu

The antechamber was of the type described for houses A and F–1. It was not as large as the former but corresponded quite closely to that of the latter. There were indications at the west side of the antechamber of a storage cist. The latter appeared to be of more recent date, as a portion of one of its slabs extended over those in the walls of the antechamber, but as it was incomplete it was impossible to tell just what its relation to the other structure may have been.

Several worn-out metates or milling stones were found in the walls of house K and its antechamber. This feature was observed in sev-

eral houses, and it is one which is quite common in structures of the same period found elsewhere in the Southwest. Metate stones were just the size and shape of the slabs used in lining the excavated portion of the structures, and even though their usefulness for preparing meal was vitiated by small holes worn through the groove or trough portion, they were still serviceable for use in house construction. Small holes or breaks in the stones would be covered by the plaster which was applied to their surfaces, and the worn and discarded metates would be as useful as new slabs.

The excavation for house K measured 13 by 16 feet (3.9624 by 4.8768 m.). When lined with slabs covered with plaster the inside measurements would have been several inches smaller than those given for the excavation. The few slabs which remained in position on the northern side of the room showed that the wall height at that point had been 2 feet (60.96 cm.), while on the south side, near the passage and antechamber, the height was 2 feet 6 inches (76.2 cm.).

The sipapu was 1 foot (30.48 cm.) in diameter and 6 inches (15.24 cm.) in depth. From the edge of the sipapu to the fire pit was 10 inches (25.4 cm.). The fire pit was circular in form, although not a perfect circle, with an average diameter of 2 feet (60.96 cm.) and a depth of 5 inches (12.7 cm.).

The distance from the edge of the fire pit to the deflector slab was 2 feet 6 inches (76.2 cm.). The latter stood about 8 inches (20.32 cm.) from the doorway to the passage. This last measurement is not absolutely correct, however, as it was necessary to estimate from the indications of the wall as to just where it had been. The deflector was 2 feet (60.96 cm.) in height, 10 inches (25.4 cm.) wide and 1½ inches (3.81 cm.) thick.

The remains of the antechamber indicated that it had measured 7 feet by 7 feet 6 inches (2.1336 by 2.286 m.). The passage seemed to have been approximately 2 feet (60.96 cm.) in length. The floor of the antechamber was only slightly higher than that of the main room. The slabs which formed its walls were 2 feet 6 inches (76.2 cm.) in height.

House L

House L was one of the best preserved of the structures in the village and might be considered as typical of the roughly circular form of dwelling. The periphery of the excavation had been lined completely with stone slabs. (Pl. 6, *a;* fig. 15.) The superstructure had been supported, as in the other houses, on four posts and there was the usual sipapu and fire pit. The two support posts on the southern side of the room showed the features noted in several other

houses, namely, the one on the west was incorporated in the compartment wall while that on the east was just against the slabs.

The fire pit was circular in form and had a raised rim of plaster around it. This rim, as in houses E and H, was a continuation of the ridge of adobe into which were set the slabs forming the partitions for the compartment on that side of the room. Just south of the fire pit was an oval depression in the floor which corresponds to those de-

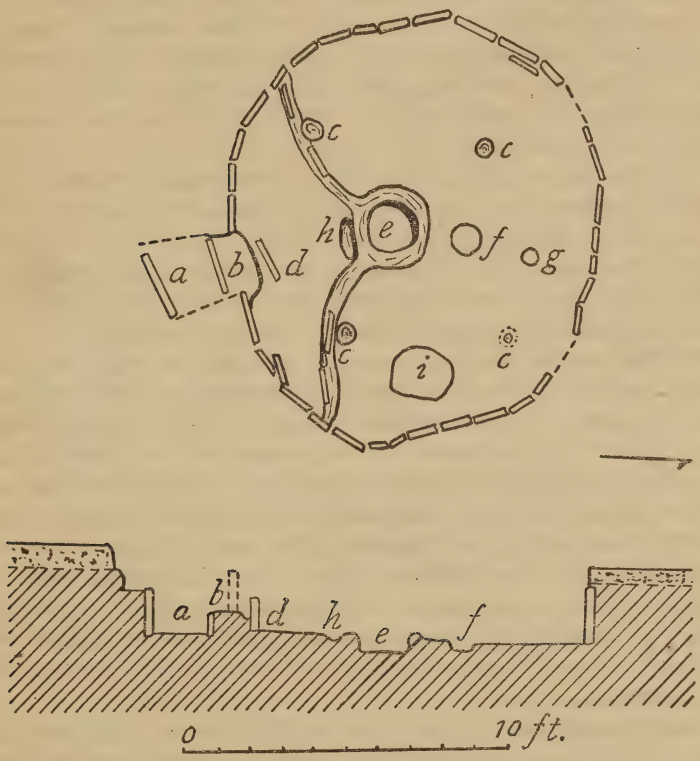


FIG. 15.—Plan of House L. *a*, Short passage. *b*, Step between passage and room. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu. *g*, Storage hole in floor. *h*, Oval depression, possibly for ladder end. *i*, Second fire pit

scribed for other houses and which may have been for the purpose of preventing the base of the ladder from slipping on the smoothly finished surface of the floor.

There was a rectangular box in the floor at the east side of the room which gave indications of having been used as a fire pit. It had not functioned during the entire period of occupancy of the house, however. It had been filled with large stones, all of which, curiously enough, gave evidence of having been burned. The heat

had been sufficient to turn them red, and their exteriors were blackened with soot. The small slabs which lined the pit were also burned brick red in color. After the loose stones had been placed in this pit ashes and other refuse were thrown in and the top was covered with plaster, so that there was an unbroken surface to the floor of the room at that point. It will be recalled that a similarly placed fire pit was found in house F–1. The same feature was also noted in one of the houses which was excavated the season before, during the progress of the investigations for the National Geographic Society. At the present time the writer knows no satisfactory explanation for this secondary pit in the structures. There is a possible explanation which will be considered when the house just mentioned is described.

The deflector slab placed directly in front of the doorway opening into the passage was somewhat smaller than those described in preceding pages and could have been of little value as an actual fire screen. Its presence is interesting, however, and is a good example of the relationship existing between the whole complex of antechamber, passage, doorway, deflector, fire pit, and sipapu.

The step at the doorway into the passage was well finished. It had a stone sill, but the riser was of adobe plaster. The latter curved into the room to a considerable extent, as will be noted from the ground plan of the structure. The passage was not lined with slabs as in the other houses, but there was clear indication of the smaller wooden poles which had furnished the framework for its walls and also the posts which had supported the roof. The existence of an antechamber is rather dubious. There were indications of a step at the end of the passage, similar to that in house J, and some suggestions of a circular excavation, so that it may well be that there was originally an antechamber, but definite evidence of such a structure was lacking.

House L measured 11 feet 6 inches (3.5052 m.) by 13 feet (3.9624 m.). The slabs on the north side of the room rose to a height of 2 feet (60.96 cm.), while at the south side they were 2 feet 10 inches (86.36 cm.) in height.

The sipapu was 10¾ inches (27.4 cm.) in diameter and 5 inches (12.7 cm.) in depth. From the edge of the sipapu to the edge of the fire pit rim measured 8¾ inches (22.22 cm.). The rim of the fire pit was 3¾ inches (9.52 cm.) thick and 2 inches (5.08 cm.) high on the north side. There was some variation in the width and height of the ring around the periphery of the pit, but the measurements taken on the north side may be considered as about the average. The interior of the fire pit had a diameter of 1 foot 8¾ inches (52.7 cm.) on its north and south axis and 2 feet (60.96 cm.) on the east and west.

The depth of the fire pit was 6 inches (15.24 cm.). The oval depression in the floor just south of the fire pit was 6 inches (15.24 cm.) wide and 1 foot 2½ inches (36.83 cm.) long. It was 2½ inches (6.35 cm.) deep.

The secondary fire pit at the east side of the room measured 1 foot 8¾ inches (52.7 cm.) on a north and south line and 1 foot 7½ inches (49.53 cm.) from east to west. It was 6 inches (15.24 cm.) in depth. This pit was 1 foot (30.48 cm.) from the east wall of the room.

The small circular hole in the floor which was located about midway between the sipapu and the north wall of the room was 6 inches (15.24 cm.) in diameter and 3 inches (7.62 cm.) deep.

From the southern edge of the rim of the fire pit to the deflector slab was 2 feet 8¾ inches (83.18 cm.). The deflector was not as large as those found in other houses. It was just 11¼ inches (28.57 cm.) high. At its base it measured 1 foot 2½ inches (36.83 cm.) across, but tapered down to 7½ inches (19.05 cm.) at the top.

The opening between the slabs forming the east and west walls of the compartment was 4 feet (1.2192 m.). The western end of the east wall was 2 feet 6 inches (76.2 cm.) from the south wall of the room. The east end of the west compartment wall was 2 feet 10 inches (86.36 cm.) from the main wall. The east cross wall was 3 feet (91.44 cm.) long and the western one was 3 feet 6 inches (1.0668 m.) in length.

The sill of the doorway to the passage was 5 inches (12.7 cm.) above the floor of the room. The doorway was 1 foot 8¾ inches (52.7 cm.) wide. The stone slab on the sill was the same length and 1 foot (30.48 cm.) in width. Because of the curve of the plaster facing of this step there were just 2½ inches (6.35 cm.) between it and the deflector. The south wall of the room was 10 inches (25.4 cm.) from the deflector.

The passage was 3 feet (91.44 cm.) long and 2 feet (60.96 cm.) wide. The floor of the passage was on a level with the floor of the main portion of the structure, so that there was a step down of 6 inches (15.24 cm.) from the sill of the doorway. The step at the outer end of the passage was 1 foot (30.48 cm.) high.

House M

One of the oddest structures in the entire village was house M. Its interior features were of such a nature that it might almost be considered as a double house. There had been two fire pits, two deflectors, and two compartments. (Fig. 16.) The south side of the room had been finished in much the same fashion as in other dwellings. It had the customary compartment, although of a somewhat different nature. The fire pit had a raised rim which was a continuation

of the low ridge of adobe which marked off that section of the room and the deflector was in its proper position near the southern wall. At the north end of the room was a second fire pit and there were clear indications of a partition which had separated this pit from

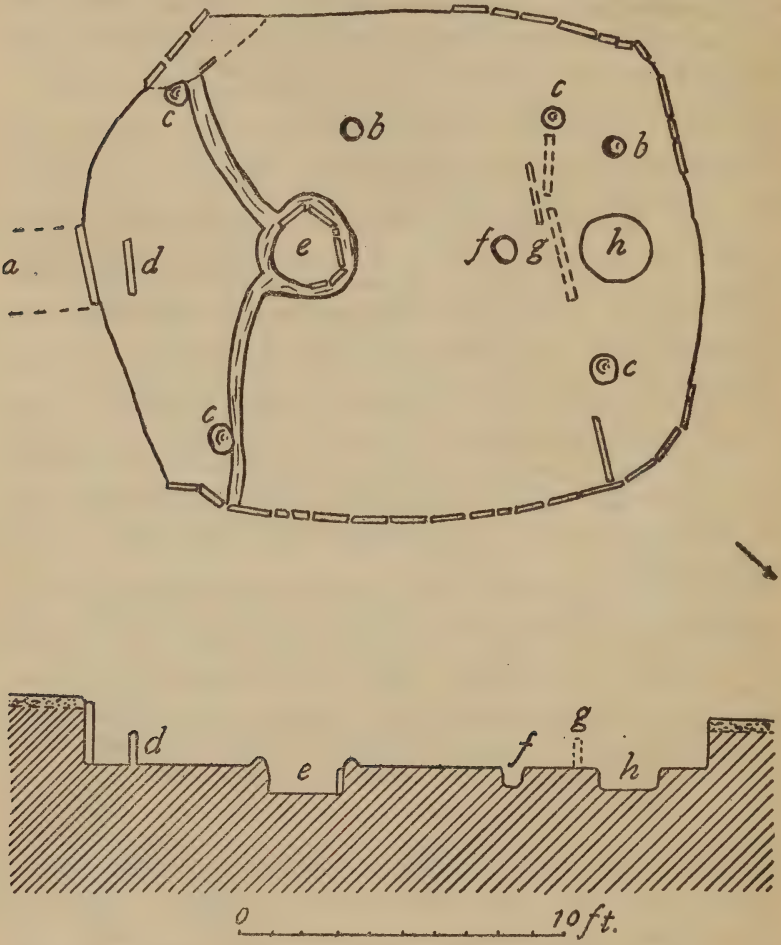


FIG. 16.—Plan of House M. *a*, Passage. b, Storage pits in floor. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu. *g*, Wall for second compartment. *h*, Fire pit

the remainder of the interior. The pit was inclosed, so to speak, in a compartment at that end of the room. The sipapu (there appeared to have been but one) was near the center of the room between the two fire pits.

In its general construction features house M did not differ greatly from the structures previously described. The excavation tended toward the rectangular shape, with rounded corners. It was not as

deep, however, as in the majority of cases and the slabs which had been used to line the periphery were much smaller. The superstructure had been supported on four interior posts.

Both fire pits were of the circular type. The one at the north had been lined with plaster while that at the south had small stone slabs covered with plaster for its interior facing. The latter pit was much more irregular in form than the one at the north. This may be attributed to the use of stones, which would render regularity of outline much more difficult of attainment than when plaster alone was used.

At the time of excavation the slabs which shut the north pit off from the rest of the room, and which formed the compartment at that place, were not in position. They had fallen and were lying on the floor. Their imprints were clearly distinguishable in the plaster, however, and the fact of their having stood in such a way as to form a low wall across that end of the room can not be questioned.

The southern compartment was somewhat different from many of those already described. It had never been a complete inclosure in the sense that those in the other dwellings were. No slabs had been placed in the plaster ridge which extended out from the walls and around the fire pit. The southern end of the room had been marked off from the remainder but not separated from it by low walls of upright stone slabs. Practically the same condition was found to exist in three other structures still to be described. Whether this is an example of a breakdown in essential house features, one which was to lead ultimately to a room without interior division, or is merely the record of an expression of individuality can not be known. Further investigations may throw more light on the subject and furnish some clue which will lead to the correct answer.

There are certain factors which point toward the indicated rather than the actual form of compartment as preceding that in which the slabs were used. The fragments of pottery found on the floor of this structure were of the crudest type secured in the village and it is quite within the bounds of reason to suppose that the southern end of the room was first marked off by the use of plaster and that later the idea of actually separating it from the main portion by placing slabs in the ridge came into vogue. There is just enough evidence pro and con to make either theory fairly plausible as an explanation but not enough to warrant the statement that either furnishes the correct solution of the problem. The writer is rather inclined to think that it represents a breakdown rather than the preceding form, despite the potsherd evidence.

At all events there can be no question of the fact that there was some important significance attached to the compartmentlike features on the south side of the room, because even when an actual

partition was missing it was, in many cases, suggested by a ridge of plaster on the floor.

No satisfactory explanation for the compartment on the north side is forthcoming, and in the light of our present knowledge it can be attributed only to individual peculiarity. The fact that it was the only one in the village lends credence to such a supposition.

Nothing definite could be determined with regard to the question of an antechamber and passage leading into the structure from the southeast. There was sufficient evidence to show that there had been a passage but nothing to indicate an antechamber. It was also impossible to determine the extent of the passage. It seemed to have been one of the pole, brush, and plaster type, with no stone used in its construction. The fact that it had been on the ground level also contributed to the difficulty with which its extent could be traced. There were simply a few scattered holes showing where the ends of the poles had been embedded.

House M had been one of the largest structures in the village. It measured 19 feet (5.7912 m.) on its long axis and 16 feet (4.8768 m.) across the short way. The wall heights on the north and south sides were 1 foot 6 inches (45.72 cm.) and 2 feet (60.96 cm.), respectively.

The north fire pit was located 1 foot 6 inches (45.72 cm.) from the north wall and was about midway between the east and west walls. This pit was 2 feet 2½ inches (67.31 cm.) in diameter and 6 inches (15.24 cm.) in depth. The compartment wall was just 6 inches (15.24 cm.) from the southern edge of the fire pit.

The sipapu was 1 foot 6 inches (45.72 cm.) from the north compartment. It was 8¾ inches (22.22 cm.) in diameter and 5 inches (12.7 cm.) deep. From the edge of the sipapu to the south fire pit was 4 feet 3¾ inches (1.3145 m.).

The rim around the south fire pit averaged 6 inches (15.24 cm.) in breadth and 3 inches (7.62 cm.) in height. The diameter of the pit was 2 feet (60.96 cm.) and its depth was 10 inches (25.4 cm.).

From the southern edge of the second fire pit to the deflector slab was 4 feet 2½ inches (1.2827 m.). The latter slab was 1 foot 6 inches (45.72 cm.) wide and 1 foot (30.48 cm.) in height. Its average thickness, like the great majority of the stone slabs used throughout the village, was 2 inches (5.08 cm.). The deflector stood 1 foot (30.48 cm.) from the south wall of the room.

The ridge of adobe which marked off the southern end of the room into the semblance of a compartment averaged 6 inches (15.24 cm.) in width and 3 inches (7.62 cm.) in height.

The average diameter of the holes for the support posts was 10 inches (25.4 cm.). They had an average depth of 2 feet 10 inches (86.36 cm.).

House N

House N was more characteristic of the general type of structure found in the village than was the dwelling just described. The excavation was of the rectangular shape with a tendency to slightly rounded corners. (Fig. 17.) As in the case of so many of the domiciles, the periphery of the excavation had been lined com-

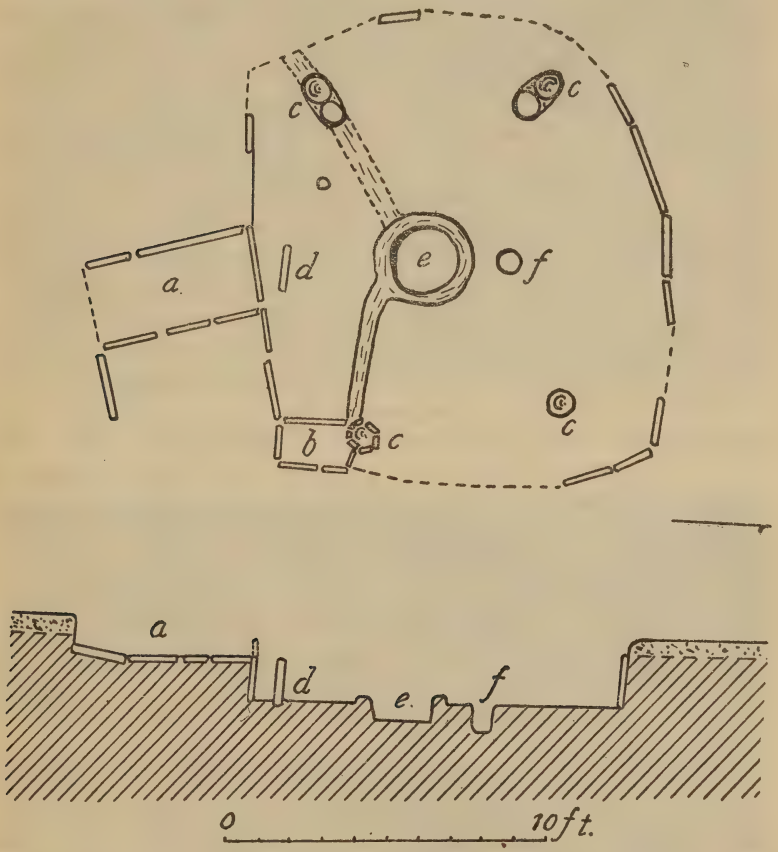


FIG. 17.—Plan of House N. *a*, Passage. *b*, Corner storage bin. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu

pletely with slabs before the coating of adobe plaster was applied to the walls. At the time when the accumulated rubbish and débris was removed from the interior of the pit a number of these slabs were found to be missing. Several of them had become loosened and had fallen to the floor. Others could not be located at all but their imprints in the plaster were quite plain.

The interior finishings of the structure were much the same as those described for houses D, F, G, and L. The superstructure had been supported on four posts set in the floor some distance from the corners of the room. There was a sipapu, a fire pit with a raised rim, and the southern end had been set apart from the rest of the inclosure by the low ridge of adobe extending out from the east and west walls. There was not a complete compartment but in the southeast corner there was a small bin formed of upright slabs. The latter were held in position by the ridge of adobe. The deflector stone was present in its customary position in front of the doorway which had opened into the house. (Pl. 6, *b*.)

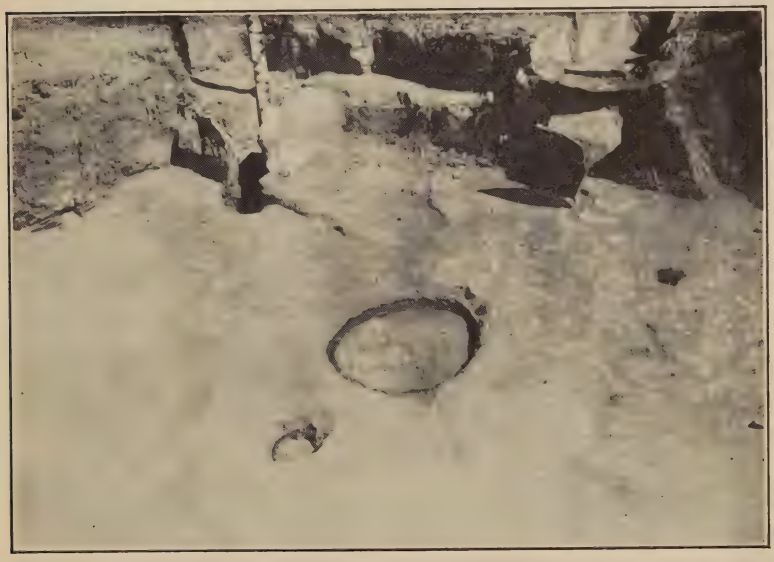
The passage in house N appeared to be of a rather simple form. It had been lined with slabs and, as in some of the other structures, its floor level had been considerably higher than that of the main room. In fact it was on a level with the top of the deflector slab. The outer third of the floor of the passage had a rather sharp upward slant. This is clearly shown in the profile drawing of the ruin. (Fig. 17.) Although the floor of the passage was higher than that of the room it still had been somewhat below the ground level, except at its outer end where its upward slope brought it almost to the old ground level. This passage floor was an exception to the general type in that it had been paved with large stone slabs. Most of the other structures had only a plaster floor in the passageway.

Little could be found of an antechamber, although there was one large stone slab in position at the east side of the exterior doorway into the passage. The latter may have been a portion of the walls of the antechamber, or, on the other hand, it may have been placed there purely as reinforcement to that end of the passage. Because of the antechamber feature in so many of the structures it is quite possible that there originally had been some form of it present in house N. That such was actually the case, however, can never be known.

House N measured 12 feet 6 inches (3.81 m.) by 14 feet 6 inches (4.4196 m.). There seemed to have been some difference between the wall heights on the north and south sides of the room. The north slabs were 1 foot 6 inches (45.72 cm.) high on the average, while those on the south side had been 2 feet (60.96 cm.). The tops of many of the slabs on the south side had been broken off.

The sipapu was 8¾ inches (22.22 cm.) in diameter and 8 inches (20.32 cm.) in depth. From the edge of the sipapu to the edge of the rim around the fire pit was 8¾ inches (22.22 cm.). The raised rim averaged 5 inches (12.7 cm.) in width and 2½ inches (6.35 cm.) in height. The fire pit was roughly circular in form and measured 2 feet (60.96 cm.) on a north and south diameter and 2 feet 3¾

a, House L



b, House N

HOUSE REMAINS

a, Protokiva house. (Photograph by Neil M. Judd. Courtesy of National Geographic Society)

b, Doorway from passage side. Note timbers for passage covering, also plaster reducing size of doorway

c, Doorway from room side. This picture shows the manner in which the original opening was later reduced in size by use of plaster

HOUSE REMAINS

inches (70.49 cm.) on its east and west axis. The floor of the pit was 7½ inches (19.05 cm.) below the floor level of the room. With its raised rim the pit had a total depth of 10 inches (25.4 cm.).

The deflector slab was 2 feet 6 inches (76.2 cm.) from the edge of the fire pit and about 6 inches (15.24 cm.) from the wall of the room. It was not parallel to the wall, but had been set in an oblique position. The slab itself measured 1 foot 6 inches (45.72 cm.) in width and 1 foot 5 inches (43.18 cm.) in height.

The small bin in the southeast corner measured, on the interior, 1 foot 6 inches (45.72 cm.) by 1 foot 3¾ inches (40.01 cm.).

The holes in which the support posts had been placed averaged 10 inches (25.4 cm.) in diameter and 2 feet 6 inches (76.2 cm.) in depth. The supports at the west side of the room had been slightly different from the majority of those in the various houses in that there was a circular depression in front of each. These depressions, or preferably storage holes, were also 10 inches (25.4 cm.) in diameter. They had a depth of 6 inches (15.24 cm.).

The doorway to the passage was 2 feet 6 inches (76.2 cm.) wide. The sill of the doorway was 1 foot 6 inches (45.72 cm.) above the floor of the room. The passage had a total length of 5 feet (1.524 m.). For a distance of 3 feet (91.44 cm.) the floor had been 1 foot (30.48 cm.) below the original ground level. The last 2 feet (60.96 cm.) sloped upward to a point 3 inches (7.62 cm.) below the old ground level.

House O

House O approached the circular form more closely than any other structure in the village. (Fig. 18.) It was also interesting for the fact that the plaster on its walls was in an excellent state of preservation. This condition might perhaps be attributed to its having been covered so completely by the wind-blown sand which covered the mesa top where it was located. The interior of the structure was filled entirely with sand which seemed to have drifted into the excavated portion of the dwelling before it had been subjected to much attack by the elements. The plaster was very good. It had broken through at one place only, and for that reason it was difficult to determine how extensively slabs had been used in lining the periphery of the excavation. At the spot where the plaster had been damaged, however, two slabs were in evidence, and it is reasonable to suppose that the entire surface of the sides of the hole had been lined with them. Because of the good condition of the plaster it was not thought that the question involved was important enough to justify the removal of portions of it to see if the slabs extended all the way around the wall. With or without slabs the house fitted into the series.

House O was rather small in size and quite simple in its interior features. The superstructure had been supported on four posts; there was a sipapu and a fire pit. The latter was circular in form and had had a raised rim of adobe plaster. There were no indications whatsoever of a compartment on the south or southeastern side of the room and there were no traces of a deflector. Evidence of a passage or antechamber was entirely lacking. It would seem that the inhabitants of this dwelling cared little about the customary fixtures for the interior of a house and had been contented merely with a fire pit and sipapu. It is quite possible that the structure may have been an unusually large storage place which was adapted for habitation purposes after its use as a granary.

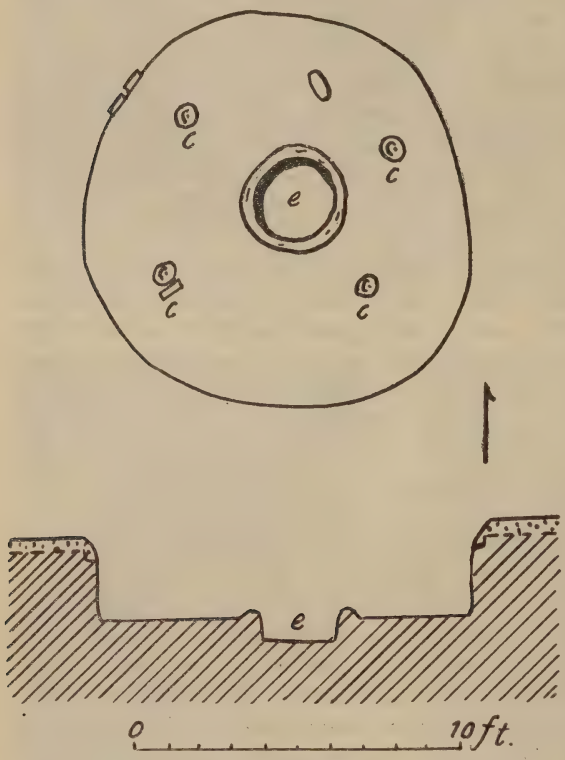


FIG. 18.—Plan of House O. *c*, Holes for support posts. *e*, Fire pit

The average diameter of house O was 12 feet (3.6576 m.). There was no distinction in wall height between the north and south sides of the room, and the average was 2 feet 6 inches (76.2 cm.).

The sipapu in this domicile was oval rather than circular in form and measured 8¾ inches (22.22 cm.) by 5 inches (12.7 cm.) in diameter and had a depth of 6 inches (15.24 cm.). From the rim of the fire pit to the edge of the sipapu was exactly 1 foot (30.48 cm.).

The rim around the fire pit was 6 inches (15.24 cm.) broad at its base and 3 inches (7.62 cm.) high. The fire pit had a diameter of 2 feet 6 inches (76.2 cm.) by 2 feet 10 inches (86.36 cm.) and a total depth of 10 inches (25.4 cm.). The floor of the pit was 7 inches (17.78 cm.) below that of the room. The greater depth was made possible by the ridge around the rim of the pit.

The holes for the supporting posts of the superstructure averaged 10 inches (25.4 cm.) in diameter and had a depth of approximately 2 feet 6 inches (76.2 cm.).

House P

This structure was quite similar to the one just described in the features of its smallness, the perfection of the plaster on its walls, and the general simplicity of its interior furnishings. It differed from the former, however, in that it approached more closely to the rectangular form, although there was considerable curve to its walls, and it had no interior support posts. The latter were placed at the corners and there was very much the same situation in roof construction as that discussed in connection with house C. In that structure, it will be recalled, the large support posts were incorporated in the walls of the dwelling. The same held true for this domicile. (Fig. 19.)

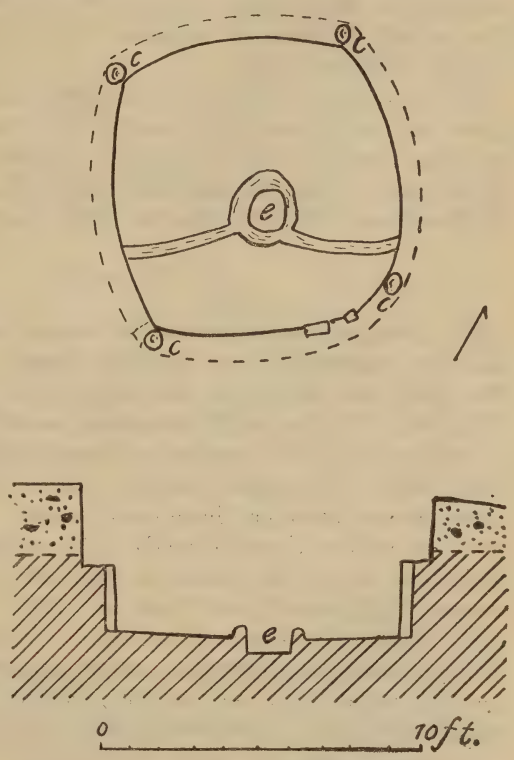


FIG. 19.—Plan of House P. *c*, Holes for support posts. *e*, Fire pit

The plaster on the walls prevented the locating of more than two slabs. The latter were in evidence near the southeast corner of the room, where some of the adobe had fallen away from their surfaces. Here again it was not thought that the question as to whether or not slabs had been used to line completely the excavation was important enough to justify the damage entailed. Hence no effort was made to locate additional stones.

House P had no sipapu, but the southeastern portion of its interior was set off from the remainder of the room by a ridge of adobe extending out from the walls and forming a raised rim around the

fire pit. No slabs had been used to make a compartment partition wall, but such a place had been suggested by the ridge. There was no deflector slab in position, nor were there any indications that there ever had been one in the room. No traces could be found of a passage, and there was no suggestion of an antechamber.

House P had been the smallest dwelling in the entire community. It measured 9 feet (2.7432 m.) by 9 feet 4 inches (2.8448 m.). There was no variation in its wall height, excepting slight irregularities in construction, the average of which was 2 feet 8 inches (81.28 cm.). The average thickness of the plaster on the walls was a fraction over 2 inches (5.08 cm.).

The rim around the fire pit averaged 5 inches (12.7 cm.) in width at its base and tapered to 2½ inches (6.35 cm.) at the top. Its average height was 3 inches (7.62 cm.). The fire pit was 1 foot 6 inches (45.72 cm.) in diameter and had a depth of 5 inches (12.7 cm.) below the floor level. With the rim its depth was 8 inches (20.32 cm.).

House Q

This structure had a number of unique features, although it fitted into the general type of dwelling found throughout the village. The shape of excavation was rectangular with rounded corners. (Fig. 20.) With a single exception, no slabs had been used to line the lower walls. The plaster had been applied directly to the native earth walls. The single exception was at the east side of the room where the entrance may have been located. Here one slab had been set in the wall at a point directly in line with the fire pit and sipapu. Along the top of the plaster at this side of the room was a single course of horizontally laid slabs, a feature somewhat similar to the use of masonry in houses A and F–1. Another curious feature was that there had been three holes which might be considered as sipapus and that all of them were on the west side of the fire pit instead of being to the north as previously observed.

Associated with the above combination was the location of the compartment feature at the east side of the room. It was the only structure in the entire group which had this orientation. In all other cases this compartment, whether actually present or merely suggested, was at the south or southeast side of the interior of the dwelling. There is no explanation readily forthcoming as to why there was this difference in house Q.

There was no true compartment in house Q, but merely the indication of one. As in the two houses just described, there was a ridge of adobe plaster extending out from the walls to the fire pit, marking off part of the floor space. This ridge did not completely encircle

the fire pit as in other structures, but formed a raised rim on the eastern quarter of the circumference only. No slabs had been set in this ridge to form a partition wall for a compartment. An additional feature was that the floor at the east side, within the boundaries of the adobe ridge, was slightly higher than that of the rest of the room. As a matter of fact it may be considered that the east side of the room had had a low platform rather than a compartment.

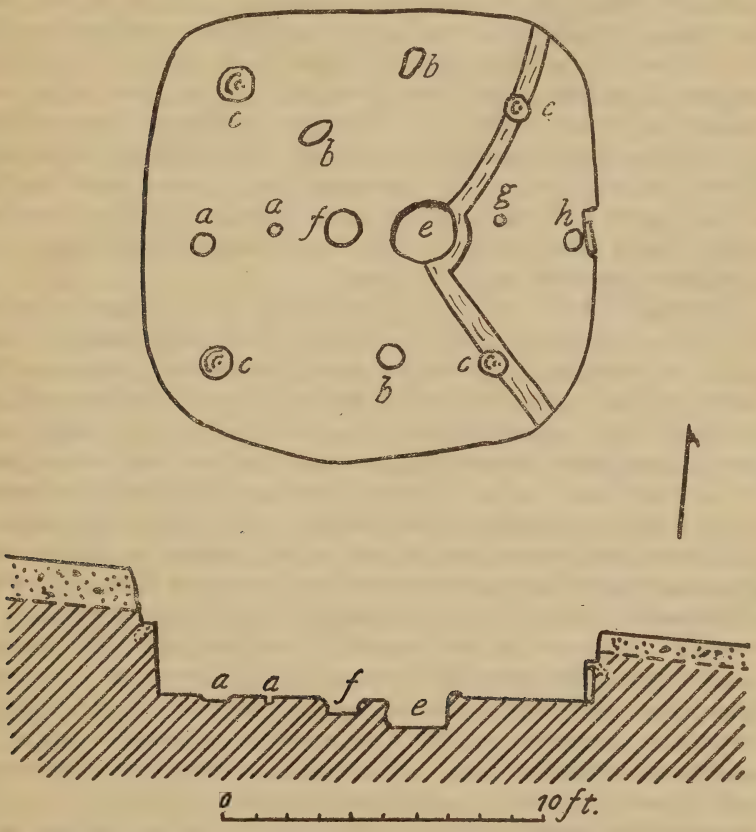


FIG. 20.—Plan of House Q. *a*, Small holes in floor. *b*, Storage pits in floor. *c*, Holes for support posts. *e*, Fire pit. *f*, Sipapu. *g*, Location of small pole. *h*, Hole in floor

Four interior posts, as in most of the dwellings, had been used to support the superstructure. The eastern posts had, at their bases, been partially included in the adobe ridge. In this respect the construction might be said to run true to form.

In addition to the three holes which were in such a position as to be considered in the light of possible sipapus, there were three holes at various places in the main part of the room, which probably

served as storage places. There were two holes in the floor in the compartment or platform portion of the room. One was located in a rather odd place and its purpose was not apparent. It was immediately in front of the single slab at the east side of the room. The very small hole between this one and the fire pit had decayed fragments of wood in it, and suggested that a small pole of some sort had been placed in it. This was in about the position which normally would be occupied by a deflector. If, as it may well have been, the deflector was of pole and plaster construction, the type noted in the discussion of house F, it naturally would be supposed that there should have been two upright posts, while there was an indication of but one. It is possible that one was all that the builders deemed necessary to anchor such a deflector in position. There was no indication of a plaster wall having risen above the floor at this point. All that can be stated definitely is that there had been a single pole standing in the floor at about the position where a deflector generally would be found.

Trenches failed to reveal any indications of a passage extending to the east and there was no evidence of an antechamber. Here again, as mentioned in preceding pages, the external portions of the house may have been constructed wholly of perishable materials, all traces of which were destroyed during the length of time which must have elapsed since the dwelling fell into ruin and was covered over by drifting sand. It is, of course, quite possible that the structure never had an entrance on the ground level. It may be supposed that under such conditions the slab which was set in the east wall at a point where the doorway would have been may have had certain significance through being ceremonially associated with such an opening. In line with this thought is the possibility that the slab was really a deflector which, because of the absence of a doorway, from a practical point of view was entirely useless, but which from a ceremonial standpoint was felt to be essential to the well-being of the inhabitants of the dwelling. All of this is, of course, pure conjecture, and it must be borne in mind that from the position of a strictly matter-of-fact consideration the only answer to the question as to why certain features were as found in this structure is that we do not know.

House Q measured 14 feet 4 inches (4.3688 m.) by 14 feet (4.2672 m.). The wall height on the west side was 2 feet 2½ inches (67.31 cm.) and on the east 2 feet 5 inches (73.66 cm.). The plaster portion of the east wall was the same height as that on the west side of the room, but the row of slabs lying along its top increased the total height.

The westernmost of the three sipapu holes was 8¾ inches (22.22 cm.) in diameter and had a depth of 2½ inches (6.35 cm.). The

second, or middle one, was slightly smaller, having a diameter of 6 inches (15.24 cm.), with the same depth. The hole which occupied the position of the true sipapu, and no doubt served in that capacity, was 1 foot 3¾ inches (40 cm.) in diameter and had a depth of 6 inches (15.24 cm.). The first hole was 1 foot 6 inches (45.72 cm.) from the west wall. From the edge of the first to the edge of the middle hole was the same distance, 1 foot 6 inches (45.72 cm.), and from the edge of the latter to the edge of the sipapu was 1 foot 2½ inches (36.83 cm.). From the edge of the sipapu proper to the edge of the fire pit measured 8¾ inches (22.22 cm.).

The fire pit averaged 2 feet (60.96 cm.) in diameter and had a depth of 10 inches (25.4 cm.). The raised rim on the eastern arc of the pit was 3¾ inches (9.52 cm.) in height and 5 inches (12.7 cm.) wide. The latter measurements are a good average for the adobe ridge extending out from the north and south walls to the fire pit.

The two additional circular holes in the main part of the room averaged 8¾ inches (22.22 cm.) and 11 inches (27.94 cm.) in diameter and had a depth of 6 inches (15.24 cm.). The third storage pit in the floor of this part of the dwelling was ovoid in shape. Its longest diameter was 1 foot (30.48 cm.), while the short one measured 7½ inches (19.05 cm.). Its depth was 5 inches (12.7 cm.).

The floor of the section at the eastern end of the room, that marked off by the ridge of adobe, was 2 inches (5.08 cm.) higher than that of the rest of the room.

The small hole in which the pole occupying the normal position of a deflector had been set was 3 inches (7.62 cm.) in diameter and had a depth of 6 inches (15.24 cm.). The hole at the base of the slab set in the east wall was 7½ inches (19.05 cm.) in diameter and had a depth of 5 inches (12.7 cm.).

The placing of the single slab in the east wall resulted in an irregular projection or pierlike feature at that point. The latter measured 1 foot 5 inches (43.18 cm.) across the face. At its north side it projected 6 inches (15.24 cm.) from the wall, while at the south it stood out but 2½ inches (6.35 cm.). The slab was 1 foot (30.48 cm.) wide and 1 foot 6 inches (45.72 cm.) high.

Structures Excavated in 1926

The ruins which were investigated during the summer of 1926 when the writer was conducting excavations for the National Geographic Society's Pueblo Bonito Expedition did not occupy the same portion of the mesa top as did those of Shabik'eshchee village. The former were on a low knoll 215 feet (65.532 m.) northwest of the large ceremonial room. There was a distinct depression between the two mounds and extensive trenching failed to reveal anything in the na-

ture of buildings in the area between the two sites. As a matter of fact there were only a few inches of earth covering the cap rock and it would have been impossible to make the necessary excavations for a dwelling, presuming conditions were essentially the same during the occupation of the site.

The structures on the knoll to the northwest belonged unquestionably to the same cultural horizon and no doubt were occupied at about the same time as those in the village. There were certain interesting though minor variations from the general type of dwelling described in preceding pages, and for that reason these structures should again be considered. Certain points in their construction which were not easily explained when they were first excavated become quite clear in the light of what has been learned from the houses uncovered during the progress of the work at Shabik'eshchee village.

PROTOKIVA HOUSE

When this structure was first described the term "protokiva" was applied to it because it contained so many features which have been considered as characteristic of the specially constructed circular ceremonial rooms of the later-day Pueblos to which the name of kiva has been applied.[32] Despite the fact that the season of 1927 showed that practically all of the dwellings of that period had the same features, there are certain factors which make it seem that the term or name first applied to the structure is still quite appropriate.

The excavation for this building was roughly circular in form and like house C in the main village in that it had been made in such a fashion that there was an encircling bench at the top. No slabs had been used to line the periphery of the excavation, which had a thick facing of adobe plaster. The superstructure had been supported on four interior posts and the small poles which formed the sloping upper walls had been embedded in the earth at the back of the bench. (Pl. 7, *a;* fig. 21.)

There was a sipapu, a circular fire pit in the center of the room, a deflector slab, and a compartment. At the south there was a well-preserved entry and passageway. At the east side of the room there was a second fire pit, rectangular in outline, similar to those described for houses F–1 and L.

One of the most interesting features in this structure was that of the compartment and deflector. In this case the partition wall formed from slabs extended all the way across the southern side of the room, except for a small opening in the center between the fire pit and doorway into the passage. It was in all respects a true compart-

[32] Judd, Archeological Investigations in Chaco Canyon [in 1926], pp. 165–166.

ment. The deflector slab was not immediately in front of the doorway into the passage, as noted in so many of the houses previously described, but stood between the opening in the low cross wall and the fire pit. It was in a position where it could quite truthfully be called a deflector. The row of slabs had been completely covered with a thick coat of plaster, and at the time the house was occupied it is probable that none of the stone was visible. The south support posts

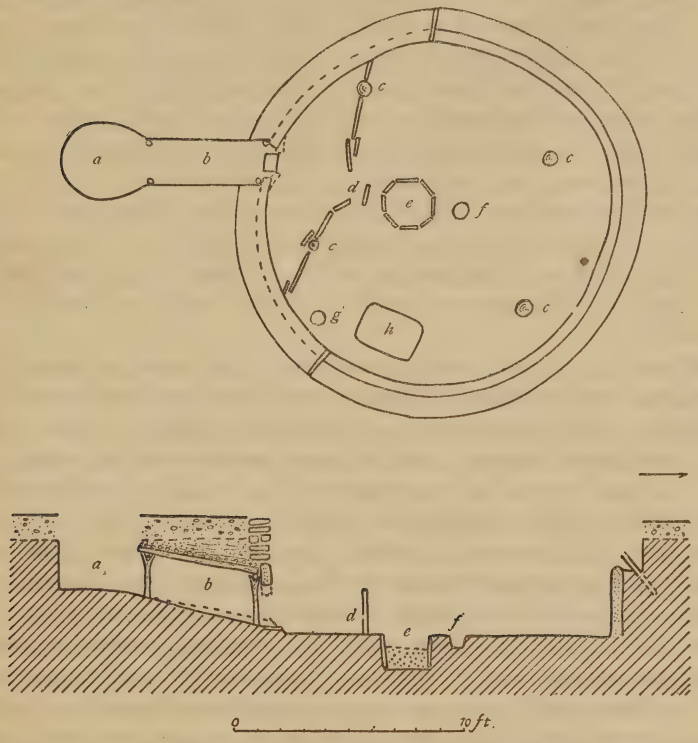


FIG. 21.—Plan of protokiva house. *a*, Antechamber. *b*, Passage. *c*, Support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu. *g*, Storage hole in floor. *h*, Second fire pit

for the upper walls and roof were incorporated in the partition wall and at the time when the ruin was opened portions of these posts were still in position.

In the eastern end of the compartment, leaning against the partition wall, was a metate or milling stone, and beside it, on the floor, were the fragments of a decorated bowl. Another metate was found on the floor east of the circular fire pit in the main portion of the room.

There was no difficulty in finding the passage or "ventilator" in this structure. The doorway or opening into the passage was directly

opposite the break in the screen of slabs which formed the compartment. The floor of the passage had a slightly upward slant and was surfaced with a thick layer of plaster. The passage terminated in an oval-shaped pit, an antechamber. Both the passage and the antechamber seemed to have been excavated at the same time as the main pit for the dwelling.

The passage had been roofed over with a structure in which poles, brush, and plaster played a large part. Four notched posts had been used. One was placed at each side of the doorway and one at each side of the passage where it opened into the entry or antechamber. Crosspieces were then placed in the crotches to serve as supports. Longer poles running lengthwise of the passage were placed on top of these supports and formed the ceiling of the passage. The latter were covered with bark and earth to the ground level. At the time of excavation portions of the four supporting poles were still in position. The cross pole at the aperture into the room was still in place (pl. 7, *b*), and the remains of the six poles which had run the long way of the passage could be traced without the slightest difficulty.

The oval pit or antechamber into which the passage opened gave no indication of ever having been covered over, but there seems little doubt but what it had had a superstructure similar to that which was erected over storage cists. Certain reconstructions which took place during the period of occupancy of the building may have obliterated traces of this covering to the antechamber. The earth walls of the latter had been very carefully plastered, the plaster continuing around and along the walls of the passage. The flooring was unbroken from the antechamber to the doorway into the room.

One of the instructive features of this dwelling was the manner in which the passage and its doorway had been reduced in size until what had originally been an entrance capable of actual use became a mere "ventilator." The changes which were made when the doorway into the room was made smaller were quite clearly shown because of the fact that when the reconstruction took place a reddish-brown plaster was used, while the original was gray in color, due to the use of ashes in it. (Pl. 7, *c*.) At the time of the excavation of the ruin, in the summer of 1926, the reduced doorway was closed by a slab of stone which had been placed against it.

The changes in the doorway were not the only ones which were made. Presumably at the time when the opening into the passage was made smaller, a section of wall was built on the southern arc of the periphery of the room. It was constructed of large slabs of stone, laid horizontally, in the form of true masonry, held in position by thick red mortar. The line of overlap between the red

plaster of the addition to the wall and the gray of the original construction was very plainly marked. Why such a change or addition should have been desired is not at all clear. It certainly must have caused some difficulty in the matter of roof rearrangement. Instead of having an even slope on all sides of the structure the southern portion would have a higher and less abrupt slant to it. This feature would have been even more marked than in the structures in the main village, where it was observed that the wall at the compartment side of the room was higher than at any other place. This variation, especially when it was as marked as in the protokiva house, would necessitate some provision for bridging the gap between the two sections of the superstructure. How this was done was not indicated in the débris which filled the room. It could have been accomplished by a series of short poles, set upright, extending from the lower to the upper portions of the roof, and diminishing in length as the two sections of the roof came closer together near the central framework. The central portion of the superstructure, that within the rectangle formed by the framework on top of the four supporting posts, was probably flat.

Entrance to the room in its revamped state must have been through an opening in the roof. Prior to the reconstruction, entrance to this structure could easily have been made through the antechamber and passage. When the size of the doorway was reduced, however, it could not have been used for such a purpose. This was not the only factor against the use of the passage. When the various additions and changes were made the builders went still further and materially reduced the size of the passage and antechamber pit. This was accomplished through the use of large blocks of stone and great quantities of mortar forming a shaft which was only about 1 foot (30.48 cm.) square. The latter corresponded more closely to what in later structures has been termed the ventilator shaft of kivas than to an actual entrance. This rebuilt shaft was much smaller even than the one in house C, which was not considered large enough to serve as an actual entrance. The work in both the shaft and passage was quite crude.

The protokiva house definitely illustrated a shift from an older to a newer style and what was once an actual entrance became merely a representative one, a passage for the bringing of fresh air into the chamber and one which quite possibly had certain ceremonial significance. There seems to be little question but what this structure represents a domicile which had been remodeled with a view to more specialized ceremonial functions.

This structure exhibited another feature which was missing in all the others excavated on top of this mesa. The excavation had not been carried down to the cap rock and there were 2 feet (60.96 cm.)

of clean sand between the floor and the top of the mesa. There was no charcoal or ash in the sand, indicating that no other structure had occupied the site and that the floor had been laid down soon after the completion of the excavation.

The two fire pits were interesting. The circular one in the center of the room was quite deep and had been lined with stone slabs whose tops were flush with the floor. The rectangular one near the east wall was rather shallow and had a facing of plaster only. The latter gave much more evidence of fire than did the former. This would suggest that it had had greater use. Just why this was done can not be explained. One interpretation might be that the structure had not been given over entirely to ceremonial use and that the ordinary fires of the day-to-day life of the people were kindled in the rectangular pit while the circular one was saved for more special occasions. At all events there were the two pits, one showing greater use than the other.

The only other feature of interest connected with this structure was not an architectural one. On the floor of the main portion of the room, lying at the west side of the circular fire pit, was the skeleton of a dog. There were no indications that it had been a burial and it is possible that the animal either fell in through the opening at the top and, being unable to escape, died there, or that when the people left the site it was forgotten and left in the room to die of starvation. The latter does not seem likely, however. In many instances the remains of dogs have been found indicating careful burial, a final mark of affection on the part of a sorrowing master. Although frequently harsh in the treatment of their animals the present Indians often show a decided fondness for them, and the same may well have been true in the past. Because of this it is perhaps more fitting to think that the dog may have returned to its former home and in prowling about fell into the room, whence it was unable to escape.

Because of the bench there was some variation in the diameter of the protokiva house. For a depth of 1 foot 6 inches (45.72 cm.) from the original ground level the diameter averaged 18 feet (5.4864 m.). The size of the excavation was then reduced to an average diameter of 16 feet (4.8768 m.). The smaller circle was still further reduced by the application of a 6-inch (15.24 cm.) coat of plaster. This gave a final average diameter of 15 feet (4.572 m.) for the lower portion of the room.

The top of the bench was 3 feet (91.44 cm.) above the floor and had an average width of 1 foot 6 inches (45.72 cm.). The masonry wall on the south side of the room rose 2 feet (60.96 cm.) above the top of the bench, making a total height of 5 feet (1.524 m.) for the wall on that side.

The sipapu was 8 inches (20.32 cm.) in diameter and had a depth of 6 inches (15.24 cm.). From the edge of the sipapu to the edge of the circular fire pit measured 10 inches (25.4 cm.). This pit was 2 feet 3½ inches (69.85 cm.) in diameter and 1 foot 6 inches (45.72 cm.) deep. The lower 1 foot (30.48 cm.) had been filled with clean sand and only the upper 6 inches (15.24 cm.) used for fire.

The rectangular fire pit at the east side of the room measured 2 feet 11 inches (88.9 cm.) on a north-and-south line and 1 foot 8½ inches (52.07 cm.) on an east-and-west line. It was 5 inches (12.7 cm.) deep. The distance from the side of this pit to the wall of the room averaged 1 foot (30.48 cm.).

The deflector slab was 1 foot (30.48 cm.) wide and 1 foot 10 inches (55.88 cm.) in height. It stood 9¼ inches (23.49 cm.) from the edge of the circular fire pit and was 10 inches (25.4 cm.) from the opening in the partition wall forming the compartment. The latter opening was 1 foot 4 inches (40.64 cm.) wide.

The average height of the row of slabs forming the compartment wall was 1 foot 11 inches (58.42 cm.), but at the time of the occupancy of the dwelling this had been increased 6 inches (15.24 cm.) by the plaster which covered them. The opening into the compartment was approximately 3 feet 6 inches (1.0668 m.) from the doorway into the passage.

The original doorway into the passage had been 1 foot 11¼ inches (59.05 cm.) in height and 1 foot 4 inches (40.64 cm.) wide. When reduced it measured 1 foot 1¼ inches (33.65 cm.) in height and 11 inches (27.94 cm.) wide. The slab which was in position in front of this smaller opening at the time when the excavations were made measured 1 foot 2 inches (35.56 cm.) by 1 foot 5 inches (43.18 cm.). The sill of the doorway was a stone slab whose upper surface was 3½ inches (8.89 cm.) higher than the floor of the room. The secondary floor in the passage was 7 inches (17.78 cm.) above the floor level of the room.

The passage was 5 feet 10 inches (1.778 m.) long, averaged 2 feet (60.96 cm.) in width, and had an average height of 2 feet (60.96 cm.) for its original dimensions. The height and width were materially diminished when this portion of the structure was remodeled. The poles used in the construction of the framework for the passage covering averaged 4 inches (10.16 cm.) in diameter.

The oval pit of the antechamber at the outer end of the passage measured 3 feet 8½ inches (1.1303 m.) on its long axis and 3 feet 5 inches (1.0414 m.) across the short way.

The large support posts for the main superstructure were 8½ inches (21.59 cm.) in diameter. They were set at a depth of 2 feet (60.96 cm.). The small poles forming the sloping upper walls

averaged 2 inches (5.08 cm.) in diameter and had been set at an average of 7 inches (17.78 cm.) apart.

The small storage hole at the east corner of the compartment was 8½ inches (21.59 cm.) in diameter and 8 inches (20.32 cm.) deep.

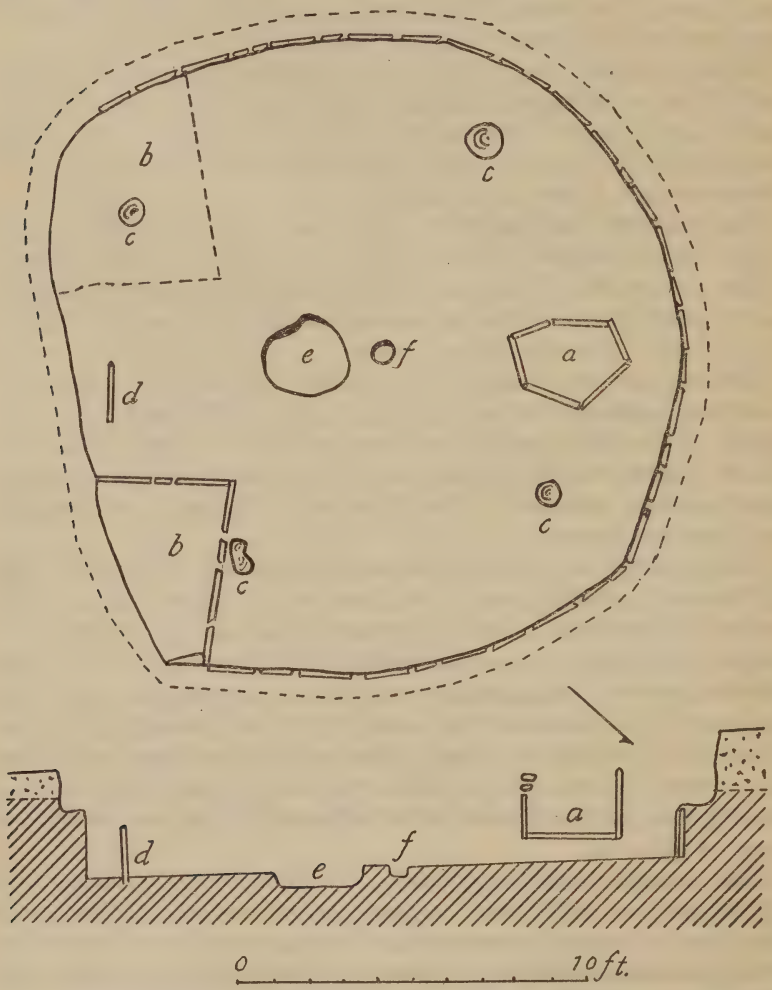


FIG. 22.—Plan of House X. *b*, Corner bins. *c*, Holes for support posts. *d*, Deflector. *e*, Fire pit. *f*, Sipapu. *a*, Fire box of later date, built on site after abandonment of house

HOUSE X

This structure belonged to the same group as the protokiva house just described but had greater similarities to the majority of the structures in the main village. The excavation for the lower portion of the house was fairly circular in form, except for the southeastern

quarter of the circumference where it was decidedly flattened. (Pl. 8, *b;* fig. 22.) The curved portions of the wall had been faced with slabs before the application of the plaster but the straight section at the southeast side was composed entirely of plaster. The sloping poles for the upper walls were set back about 1 foot from the tops of the slabs, making more of an offset or bench than was found in most of the structures on the mesa top.

The interior furnishings had run quite true to type. There had been four posts to support the superstructure. These posts were roughly placed in the directions of the four cardinal points of the compass. The sipapu was on the northwest side of the fire pit, which was crudely circular in shape. There was a deflector slab in position near the south wall. There had been the suggestion of a compartment. The latter was quite like the compartment in house F–1 in that there had been two bins, one at the east and one at the west end. The east bin was in a good state of preservation but that at the west had completely fallen apart. Its general size and shape could be determined, however, from the imprints of the slabs in the adobe ridge and from the stones themselves. The latter were lying on the floor where they had fallen.

The east bin had been constructed of five slabs of stone. The latter formed two of its walls while the other two were supplied by the walls of the room itself. The spaces between the slabs had been filled with adobe plaster, which also had covered their surfaces. On the floor of this bin was a large milling stone or metate. The hand stone or mano was lying in the groove or trough of the metate, presumably where the woman who last had used it left it. Two more of these milling stones were found on the floor in such a position as to indicate that they had been within the confines of the bin at the opposite side of the room. The latter also had their hand stones in place in the grooves.

There was no indication of an entrance or passage at the south side of the room, and it is quite possible that this structure, as in the case of several previously described, had had one of the highly perishable type. There is also the possibility that there was no entrance on the ground level and that access to the interior was limited to the smoke hole at the top. The wall at this side of the house was higher than that beyond the confines of the compartment. There was about the same variation as noted in some of the dwellings of the main village on the knoll to the southeast.

The hexagonal cist indicated by dotted lines in the northwest portion of the ground plan of the room was of later date. (Fig. 22.) After the house had been abandoned and had fallen into decay a later group occupying the same site constructed a large fire pit. In

making this pit they placed it, perhaps unknowingly, within the boundaries of the former domicile. The bottom of this fire pit was several inches above the floor of the room. The space between was filled with débris which had accumulated during the interval elapsing between the time the house fell into ruin and the fire pit was constructed.

House X had been fairly large. It measured 17 feet 6 inches (5.334 m.) by 18 feet 3¾ inches (5.5816 m.). The wall at the north side was 1 foot 6 inches (45.72 cm.) high, while that at the south or compartment side measured 2 feet (60.96 cm.).

The sipapu was 7½ inches (19.05 cm.) in diameter and 5 inches (12.7 cm.) in depth. From the edge of the sipapu to the rim of the fire pit measured 7 inches (17.78 cm.).

The average diameter of the fire pit was 2 feet 6 inches (76.2 cm.) and its depth was 8 inches (20.32 cm.). The rim around the pit was so greatly damaged that it was impossible to tell what its measurements had been, except that the traces on the floor suggested a width of 5 inches (12.7 cm.). From the edge of the fire pit to the deflector slab was 4 feet 3¾ inches (1.3144 m.).

The deflector was 1 foot 8¾ inches (52.7 cm.) wide and stood 1 foot 6 inches (45.72 cm.) high. It was not parallel with the wall of the room. At its east end it was 1 foot (30.48 cm.) from the wall and at the west end 1 foot 2½ inches (36.83 cm.).

The bin at the east end of the compartment measured, along its slab walls, 4 feet (1.2192 m.) by 5 feet 6 inches (1.6764 m.). Its east wall, a portion of the room wall, was 1 foot 2½ inches (36.83 cm.) long and the fourth wall, also a part of the room, measured 5 feet 10 inches (1.778 m.). The average height of the slabs was the same as that of the southeast wall of the room, 2 feet (60.96 cm.).

The traces of the west bin showed that the slabs which formed the walls inside the room made a partition 6 feet (1.8288 m.) long by 5 feet (1.524 m.) in width.

The interior support posts averaged about 8 inches (20.32 cm.) in diameter and were set at a depth of 2 feet (60.96 cm.) in the cap rock.

The secondary fire pit measured 3 feet (91.44 cm.) by 2½ feet (76.2 cm.), with a depth of 2 feet (60.96 cm.). Its floor was 7 inches (17.78 cm.) above the floor of the room.

ARROYO HOUSE

At the foot of the eastern end of the escarpment upon which Shabik'eshchee village is located there is a small rincon extending back into the mesa for some distance. In the floor of this narrow side canyon surface water has cut an arroyo or gully of considerable

depth. The washing of this gully was a fortunate circumstance from the viewpoint of the archeologist, because it exposed the ruins of a small pueblo structure and, at a much lower level, the remains of a dwelling of the type found in the main village on top of the mesa. The floor of the Basket Maker III structure is 13 feet 6 inches (4.1148 m.) beneath the present surface.[33] (Pl. 8, *a*.)

While a great part of the remains of the structure had been washed away there was enough of it left to enable the observer to identify it as belonging to the period represented by the one-room domiciles on top of the mesa. The fragments of pottery found on its floor were of the same type as the potsherds and vessels from the mesa top and there can be no question as to its belonging to the Late Basket Maker group.

The chief interest in this structure lies in the fact that its floor is 6 feet 6 inches (1.9812 m.) beneath the foundations of the small pueblo. This shows beyond doubt that the type of structure and culture which it represents is much older than the pueblo forms. The superposition of the Pueblo cultures over Basket Maker groups has been found in so many places that the greater antiquity of the latter can no longer be questioned. The strata in the arroyo bank showed quite clearly that the Basket Maker structure had gone into ruin and had been completely covered over and all traces of it obliterated long before the small pueblo structure had been erected at the same site.[34]

Because of its location and the danger from overhanging banks it was possible to do little more than trace the floor level and wall locations of this structure. The remains of one of the support posts were found, however, as well as a central circular fire pit with deflector in place at the south side. The doorway, passage, and antechamber, if there had been such features, had been completely washed away.

Court Near Storage Bins

From what is known of the customs and practices of more recent house-building Indians of the Southwest, it may be assumed with a fair degree of certainty that the inhabitants of the village on the mesa top lived the greater part of their lives in the open air. The houses were no doubt used as places of refuge in time of storm and

[33] Judd, Archeological Investigations in Chaco Canyon [in 1926], pp. 166–167.

[34] Doctor Cummings (Kivas of the San Juan, p. 274), in referring to similar structures in northeastern Arizona, says: "In some instances these older habitations were filled up and well-constructed rooms of stone and clay of the so-called Cliff Dwellers built above them." Mr. Morris (Exploring in the Canyon of Death, p. 272) reports a similar condition existing in Mummy Cave, and the writer has seen evidences of such a superposition in Tsaahatso Cave, in the same canyon, where Mr. Morris also worked. Another undisputable example was found by Mr. Guernsey and Doctor Kidder (Basket-Maker Caves, p. 3) in their Sunflower Cave.

probably were occupied quite continuously during the winter months when the bleak mesa tops were swept by chill winds and occasional snow. When the weather was more propitious the structures probably served only as places for sleeping and the storage of personal

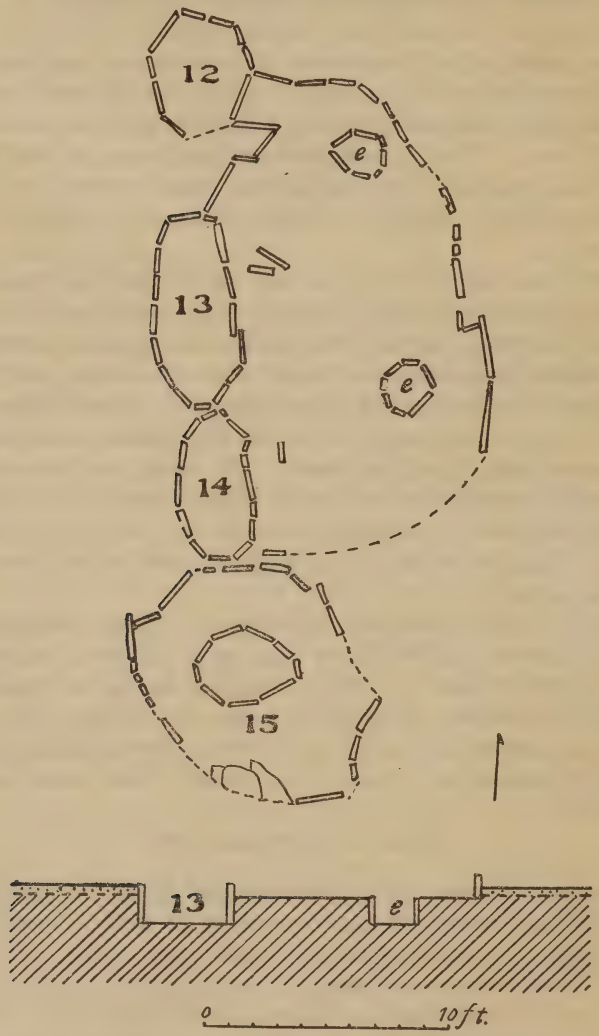


FIG. 23.—Plan of court. 12, 13, 14, and 15, Storage bins. *e*, Fire pits

possessions. Judging from the fire pits scattered throughout the village, much of the cooking was done in the open. An excellent illustration of the provisions which were sometimes made for this phase of outdoor life was found in the remains of a court located at the east side of a group of storage bins. (Fig. 23.)

a, Arroyo house. Floor of house is in right bank just below shoulder level of Indian boy. (Photograph by Neil M. Judd. Courtesy of National Geographic Society)

b, House X

HOUSE REMAINS

a, Southeast portion of kiva

b, Bins Nos. 8 and 9. Remains of House A in background

The court was inclosed on the north, east, and south sides by a low wall of stone slabs which had been set upright in the ground. The floor of this inclosed space had been paved with large flat, irregularly shaped stones, which in turn had been covered with a thick layer of adobe plaster. There were no signs of a superstructure; in fact, there was nothing to suggest that the space had ever been roofed over. It had not been excavated like the houses and its paved floor was on the same level as the surface of the ground at the time when the village was inhabited. The people may have had a temporary brush shade erected over the court, but careful search failed to reveal any postholes. The storage bins on the west side would have broken the wind, provided its prevailing direction was then, as it is now, from the west, and would have given considerable protection to those who were making use of the fire pits located at either end of the court.

The fire pits contained a considerable amount of wood ashes, more than in any of the houses, and the slabs which lined them had been subjected to a great amount of heat. These factors may be taken as indicating a considerable use for the pits. Whether this use was a moderate one continuing over a long period of time or whether it represents greater use over a shorter interval can not be ascertained.

There were many broken bones, the majority of them from deer or antelope, scattered about the floor, and in the recess formed by the curving walls of bins 13 and 14 were fragments from several pottery vessels. There were two metates on the floor. One was next to the slabs forming the east wall of bin 13 and the other was at the base of the wall of slabs connecting bins 12 and 13.

The average measurements for the court were 19 feet (5.7912 m.) by 9 feet (2.7432 m.). The north fire pit measured 2 feet (60.96 cm.) by 1 foot 8½ inches (52.07 cm.), with a depth of 1 foot 6 inches (45.72 cm.). The pit at the south was 2 feet (60.96 cm.) by 1 foot 10¼ inches (56.51 cm.) and 1 foot 4 inches (40.64 cm.) deep.

Large Circular Structure, the Kiva

One of the most interesting, and at the same time unexpected, features of the village was that of the large circular chamber which has been referred to in previous pages as a kiva. The use of the latter term in connection with this structure may be questioned by some because of the practice of many writers of restricting it to the highly developed circular ceremonial rooms of the Pueblo peoples. Inasmuch as the form was first known in its perfected state, as found

in the comparatively late communities of the fully developed Pueblo periods, there has been some opposition to the use of the term when speaking of the simpler but unquestionably comparable rooms of earlier cultural horizons. Certain features which have been held essential to the kiva are missing in the present structure, but on the whole there are sufficient grounds for using the name.

In the reports of early investigators such structures are called "estufas," a name which was applied to them by the Spanish explorers in the Southwest. This was not a happy choice of terms, however, as it usually was translated "sweat house," which was misleading. Because of this Maj. J. W. Powell, first chief of the Bureau of American Ethnology, suggested the adoption of the Hopi word "kiva," and since its introduction by Victor Mindeleff it has gradually replaced the Spanish word and at the present time is used exclusively when reference is made to the specialized ceremonial room, whether in the modern villages or in the ancient ruins. In presenting the new term Mindeleff went further and gave the following definition:

> The word "kiva," then, will be understood to designate the ceremonial chamber of the pueblo-building peoples, ancient and modern.[35]

At a conference of southwestern field workers held at Pecos, New Mexico, in August, 1927, there was much discussion of the term "kiva" and of the parts which are considered, or have been considered, essential to structures which bear that name. It was found that there is such a variety of types and so many differences in internal arrangement and that the various forms grade into each other with so little perceptibility that it is impossible to draw valid distinctions between the functions of the several forms of round, square, subterranean, and above-ground types. For this reason a very broad definition was adopted, and the present interpretation of the term by the active investigators is that a kiva is a chamber specially constructed for ceremonial purposes.[36]

Under the Mindeleff definition the term is restricted to Pueblo peoples, but that is easily understood when it is recalled that the Basket Maker culture was not discovered until after his paper was written and that the existence of special ceremonial rooms among the structures of the Late Basket Makers was not discovered until very recently. If his definition were applied in the strictest sense of the meaning of Pueblo, the word "kiva" could not be used when reference is made to the structures of the earlier culture. Such a limitation was removed, however, by the Pecos definition, and on the basis of the latter the word may be applied, with perfect justification, to the structure in the Chaco Canyon village.

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[35] Mindeleff, Study of Pueblo Architecture, p. 111.
[36] Kidder, Southwestern Archeological Conference, p. 490.

Prior to the excavation of the kiva there was nothing to indicate that such a structure had at one time occupied that portion of the knoll on which the village was located. Generally when there has been as large a subterranean chamber as that which formed the main portion of this kiva there is some indication, such as a slight depression, on the surface of the ground. In this instance there was only a gentle slope falling away toward the low ground which separated the main village from the ruins on the opposite knoll. It was somewhat of a surprise, then, when trenches revealed the buried remains of a building, and this surprise became even more marked when the extent of the ruin was developed and it became apparent that the structure being uncovered had been a kiva. Such a feature in this early period was rather rare, as only two or three questionable forms, more suggestive of dance plazas than kivas, had been found, and these have not been described.

During the process of clearing the débris from the interior of the chamber some interesting information was obtained concerning the manner in which it had accumulated. At the center of the room the fill was 4 feet 2½ inches (1.2827 m.) deep. The top stratum, which was clearly marked, was 1 foot 10 inches (55.88 cm.) thick and was composed in large degree of sand, ash, charcoal, an occasional stone spall, bone fragments, and potsherds. The appearance of this layer was decidedly suggestive of the material generally found in a village refuse mound.

Below this stratum of refuse were two thin strata of water-washed sand. Each averaged 2½ inches (6.35 cm.) in thickness. This is quite clear evidence that after the fill in the structure had reached that level it had been exposed to the weather over a period of time during which no refuse was deposited.

Immediately beneath the two thin strata showing the effects of water action was a third layer which had about the same thickness as the two above combined. It was composed of sand, ashes, bits of charcoal, stone spalls, an occasional bone fragment, and a few potsherds. The latter were not as plentiful here as they were in the top stratum. This was clearly another layer of village refuse. The dividing line between this and the stratum below it was a fairly compact water-settled surface, the top of another layer of typical refuse-mound material. Except for the water line indicating a break there was no distinction between this layer and the one above it. Throughout the stratum, which was 1 foot (30.48 cm.) thick, were thin streaks of water-deposited silt. An even smaller amount of potsherds were found here than in the stratum immediately above.

The 7 inches (17.78 cm.) of débris lying on the floor of the structure were composed in large part of burned roofing material. There

were the remains of large timbers, small poles, charred pine needles, plaster, stone slabs, and sand. This was clear indication that the superstructure of the kiva had burned. Additional evidence of the conflagration was to be found in the plaster on the walls, bench, and floor. The latter had been subjected to such intense heat that it was a decided red in color and about as hard as the average building brick.

The north side of the roof had been more nearly consumed by the flames than the south side. In the former section of the room the burned débris was lying directly on the floor, while at the south the beams had not burned entirely through. They had dropped down to the floor at the center of the room but their outer ends rested on the top of the bench at the base of the wall. They had supported the other roofing material long enough to permit an accumulation of wind-blown sand between them and the floor. In the roofing material at this side of the inclosure were quantities of charred cedar bark. The latter apparently had been placed over the smaller poles, twigs, and brush just before the plaster was spread over the top of the superstructure.

The indications in the débris which filled the interior of the kiva that refuse was deposited there during at least two different periods suggests a possible side light on the activities of the people of this village. The first layer above that of the burned material from the superstructure was comparatively thick and may be considered as having found its way into the excavation over a period of time immediately following the destruction of the building. Its thickness indicates that an appreciable length of time, possibly several years, judging from the rate of accumulation of such deposits around present Indian habitations, must have been consumed in its growth. That its deposition was not rapid is also witnessed by the many fine water streaks in its body. These no doubt record the moisture of several winters and a number of summer rainy seasons.

The hard surface at the top of the stratum may have been caused in a number of ways. It might be interpreted as showing that an unusually heavy snow had covered it for a considerable length of time and that the accumulation of water during the period in which it was melting had packed the surface to a distinct hardness. On the other hand, it might have been that a large amount of water collected in the hole after a series of heavy rains or a cloudburst. Whatever the cause, the top of this stratum shows distinctly the effects of standing water. After the latter had disappeared new material was thrown into the pit over a period much shorter in its duration than that consumed in the deposition of the stratum below.

Then comes a decided break. There are the two layers of clean sand containing no charcoal, ash, or other signs of human activity, both of which show water action. It is not likely that water washed the sand into the pit, but rather that it was blown in by the wind and then settled into compact strata by collecting water. It will, of course, be understood that this happened twice, once for the lowest of the sand strata and again for the upper. There can be no question but that this action was distributed over a comparatively long period of time, especially since there was very little sand material on top of the mesa to be blown into the pit. These strata are a distinct record of a period during which no waste from the village was dumped into the pit.

Any explanation for the hiatus in the fill must be, of course, pure conjecture. It can never be known definitely what transpired. However, it may be taken as an indication that the village was abandoned for a period and then reoccupied, or, on the other hand, it is quite possible that for a time the people dumped their refuse at another place in the village. The former explanation seems the more logical, because it would be practically impossible, under normal conditions, for a deposit to be built up to as great a depth as that of the two sand strata without some objects indicative of human occupation finding their way into the pit. Children at play are great distributors of broken pottery and other objects, and it would be strange indeed for a place as near to inhabited dwellings as the kiva was not to contain some signs of their activities.

Although the Late Basket Makers had reached a fairly sedentary stage of culture, they no doubt were inclined to revert on occasions to the nomadic form of life. They may have absented themselves from their villages for months at a time following the ever elusive game, a practice not unknown among the Indians of later days. If they had had a crop failure or if other misfortunes had befallen them it is quite logical to suppose that they may have left the location for a time and then returned to it at some later date. The evidence of the refuse fill and the dismantled houses, previously discussed, rather indicate that such an occurrence took place at Shabik'eshchee village.

It is quite possible that the fire which destroyed the kiva was responsible for the partial burning of house F–1 and the resultant construction of house F inside of the walls of the former. There was nothing to indicate that any attempt had been made to rehabilitate the kiva, however. After the conflagration the pit became a likely place for the disposal of waste from the village and was put to that use, as stated in preceding paragraphs.

The excavation which the builders made for the subterranean part of the kiva was fairly circular in outline. (Fig. 24.) As in the houses, slabs were used extensively in its construction. The periphery of the excavation had been lined with large flat stones and the facing of the low bench around the base of the outer wall was of the same material. (Pl. 9, *a*.) There was some difference in the method of

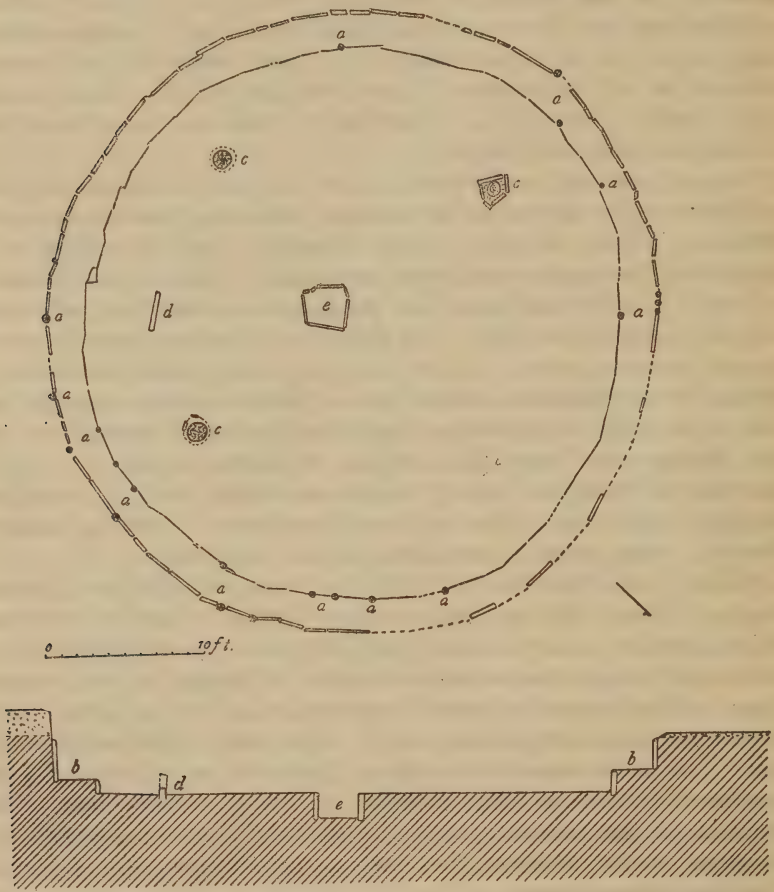

FIG. 24.—Plan of kiva. *a*, Posts in face of bench and back wall. *b*, Bench or banquette. *c*, Support posts. *d*, Deflector. *e* Fire pit

construction, however. In addition to the stones and plaster, timbers were used. Long poles supported on short posts were found in both the facing of the bench and the outer circle of slabs. The short upright posts were set at intervals between the edges of the slabs and the longer poles were placed horizontally along their tops. (Fig. 25.) This seems to have been done with the idea of leveling the uneven upper ends of the slabs and also, no doubt, to strengthen

the walls.[37] Such a provision would be of great assistance in carrying the heavy timbers which furnished the framework for the roof. In the present structure the smaller poles were not embedded in the earth around the periphery of the room but seem rather to have rested on the outer wall and to have sloped upward to rest on the framework supported by the four upright posts in the interior of the room.

The interior furnishings seem to have been much simpler even than those in the ordinary dwellings. As mentioned above, there were the four large posts, placed in positions quite closely oriented to the cardinal points of the compass, which carried the superstructure. One feature here present which was missing in the other structures was that of the bench around the base of the outer wall. This bench had been constructed by setting up a row of short slabs within and

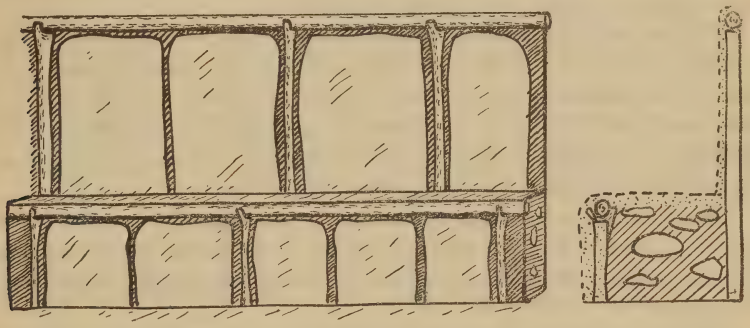

FIG. 25.—Constructional feature in kiva, showing use of poles in face of bench and back wall

at some distance from the inclosing circle of the room. The space between the two rows of stones had been filled with broken stones of irregular shapes and adobe mortar. The top of the bench, as well as its facing, had a smooth, hard coating of adobe plaster.

In the center of the room was a rectangular-shaped fire pit. Small stone slabs had been used to line the walls of the pit, but its bottom was not paved. There was no sipapu at the north side of the pit. In fact the only holes in the floor were those for the support posts, the butt ends of which were still in place, and the fire pit.

The broken end of a large stone slab was firmly in position in the floor between the fire pit and the southeastern wall of the room. This had no doubt been the deflector. There had been an opening in the

[37] Circular rooms constructed of flat stones set up on edge, braced by posts and poles, were noted in Moonlight and Water Lily Canyons, tributaries of the Sagie ot Sosie, in northeastern Arizona, by Doctor Cummings. (Kivas of the San Juan, p. 274.) These may be similar to the present use of timber in the walls, although the description is not complete enough to be certain of it.

wall of the kiva, above the bench, opposite the deflector and fire pit, but there were no indications of a passage or antechamber. It is quite possible that a perishable form of passage had existed, as there were the remains of posts on both sides of the opening. The latter was quite small, however, and probably was used more as a ventilator than as an entrance. The principal means of access to the interior was no doubt through the smoke hole at the center of the roof.

The diameter of the outer circle of slabs was 40 feet (12.192 m.) and the inner, the face of the bench, averaged 36 feet (10.9728 m.). The slabs forming the main wall of the room rose to a height of 2 feet (60.96 cm.) above the bench on the north side of the structure and were 2½ feet (76.2 cm.) high on the south side. The average height of the bench was 1 foot 3½ inches (39.37 cm.). Its width varied considerably in certain sections, as shown on the ground plan, but on the average it was 2 feet (60.96 cm.).

The fire pit measured approximately 2 feet 6 inches by 2 feet 6 inches (76.2 cm. by 76.2 cm.), with a depth of 1 foot 6 inches (45.72 cm.). The deflector was 9 feet (2.7432 m.) from the fire pit. The slab was 3 feet (91.44 cm.) wide and 5 inches (12.7 cm.) thick. What its height had been could not be determined. From the deflector to the bench averaged 4 feet 3½ inches (1.3081 m.).

The opening in the wall which has been referred to as the possible ventilator was 1 foot 6 inches (45.72 cm.) above the top of the bench. It was 1 foot (30.48 cm.) wide. Its original height could not be determined.

The support posts for this structure were larger than any of those previously mentioned. They averaged 15 inches (38.1 cm.) in diameter. In spite of their greater size and the fact that they had considerably more strain to withstand they were only placed at a depth of 2 feet 6 inches (76.2 cm.) below the floor level. They had been securely braced, however, with large stones.

One of the salient points in the finding of the remains of this large structure is the evidence which it gives to show that a specialized circular ceremonial room was developed in the Southwest prior to the appearance of true Pueblo peoples, a feature which is contrary to the belief held by many who have attributed its development to the new arrivals. Another suggestion is that here is a clue, perhaps, leading to a possible explanation for the existence of two forms of kivas in the San Juan area during the prehistoric period of the Pueblo cultures. The smaller, more numerous type was quite possibly dedicated to the performance of the ordinary ceremonies of the clan, the observances once held in the dwelling, and for that reason retains many of the features of the early house type. On the other hand, the great communal ceremonies, those in which all of the men

of the village took part, possibly those associated with the kindling and preservation of the sacred fire and the worship of the sun, were held in the large structures, the so-called great kivas, of which the one in the Chaco Canyon Late Basket Maker village may have been a forerunner.

Influence of Early Dwellings on Later Kivas

It has long been held by archeologists that the circular kivas of the Southwest represented the old original dwelling. Mindeleff in his Study of Pueblo Architecture suggested that—

> Embodied in its construction may be found survivals of early methods of arrangement that have long ago become extinct in the constantly improving art of housebuilding, but which are preserved through the well-known tendency of the survival of ancient practice in matters pertaining to the religious observances of a primitive people.[38]

Baron Nordenskiöld, in his Cliff Dwellers of the Mesa Verde, expressed the same idea when, using the old Spanish term of "estufa" instead of "kiva," he wrote:

> The round shape of the estufa is most easily explained on the hypothesis that it is a reminiscence of the cliff-dwellers nomadic period. There must be some very cogent reason for the employment of this shape, for the construction of a cylindrical chamber within a block of rectangular rooms involves no small amount of labor.[39] We know how obstinately primitive nations cling to everything connected with their religious ideas. Then what is more natural than the retention, for the room where religious ceremonies were performed, of the round shape characteristic of the original dwelling-place, the nomadic hut?[40]

Traditional explanations as to the form of the kiva and its meaning have been obtained from the Hopi Indians and Mindeleff reports some of the old men as relating that—

> The kiva was excavated in imitation of the original house in the interior of the earth, where the human family were created, and from which they climbed to the surface of the ground by means of a ladder, and through just such an opening as the hatchway of the kiva.[41]

Dr. J. Walter Fewkes, making use of information obtained from sources similar to some of those mentioned by Mindeleff, the Hopi traditions, wrote:

> The word "kiva," now universally employed in place of the Spanish designation "estufa" to designate a ceremonial room of the Pueblos, is derived from the Hopi language. The designation is archaic, the element *ki* being both

[38] Mindeleff, Study of Pueblo Architecture, pp. 111–112.

[39] Reference is made to the practice of building the circular room within the walls of a rectangular one. This was an almost universal custom during Pueblo III and the following period. It was the only way in which a circular room could be incorporated readily into a large block of rectangular inclosures and it also made concealment of the location of the ceremonial room a comparatively easy matter.

[40] Nordenskiöld, Cliff Dwellers of the Mesa Verde, p. 168.

[41] Mindeleff, op. cit., pp. 117–118.

Pima and Hopi for "house." It has been sought to connect this word with a part of the human body, and esoterically the kiva represents one of the underworlds or womb of the earth from which the races of man were born. It is highly appropriate that ancient ceremonies should take place in a kiva, the symbolic representation of an underworld, for many of the ceremonies are said to have been practiced while man still lived within the Earth Mother.[42]

There can be little question but that many of the explanations which are considered purely in the light of a symbolical or mythological nature originated long after the practice of building the kivas in such a fashion had become well established. Such an interpretation has no doubt been made of statements which essentially were matter-of-fact traditions concerning the old-time houses and house life. It is literally true that the ancient people lived in the ground. One form of such a habitation is shown in the structures described in preceding pages. There is no question in the mind of the writer but that at the time of the occupation of the Chaco Canyon village many of the lesser ceremonies were performed in the houses. As they may be considered as being within the Earth Mother it seems quite logical to suppose that the traditions of such occurrences originally recalled actual happenings and are not to be regarded wholly in the light of mythological beliefs. Mindeleff in his work at Hopi sensed some such complication of fact and fancy and remarked on the apparent confusion in Hopi traditions between the existence of circular kivas and an early mythic form of structure.[43] From what is now known of the early house types it seems quite clear that the traditions must have had reference to a time when the dwelling and kiva were one and the same thing.

In order that the reader may appreciate to how great an extent the circular kivas of the San Juan area retained essential features of early interior house arrangement, attention will be turned to a brief consideration of kivas in general. There are, of course, certain gaps in our knowledge of the transition from the early house to the true kiva and a step-by-step development of the latter can not be shown at this time. There is sufficient evidence, however, to demonstrate that that structure does indeed contain survivals from an older, more primitive dwelling.

The earliest kivas, under normal conditions, were circular, semi-subterranean rooms detached from the main building. Their roofs were level with the surface of the ground and entrance was generally through the central opening in the roof, which served as a combined hatchway and smoke hole.

Later the kivas were attached to the main building and eventually were brought above ground and incorporated into the pueblos. It

[42] Fewkes, Cliff Palace, p. 48, note a.
[43] Mindeleff, op. cit., p. 135.

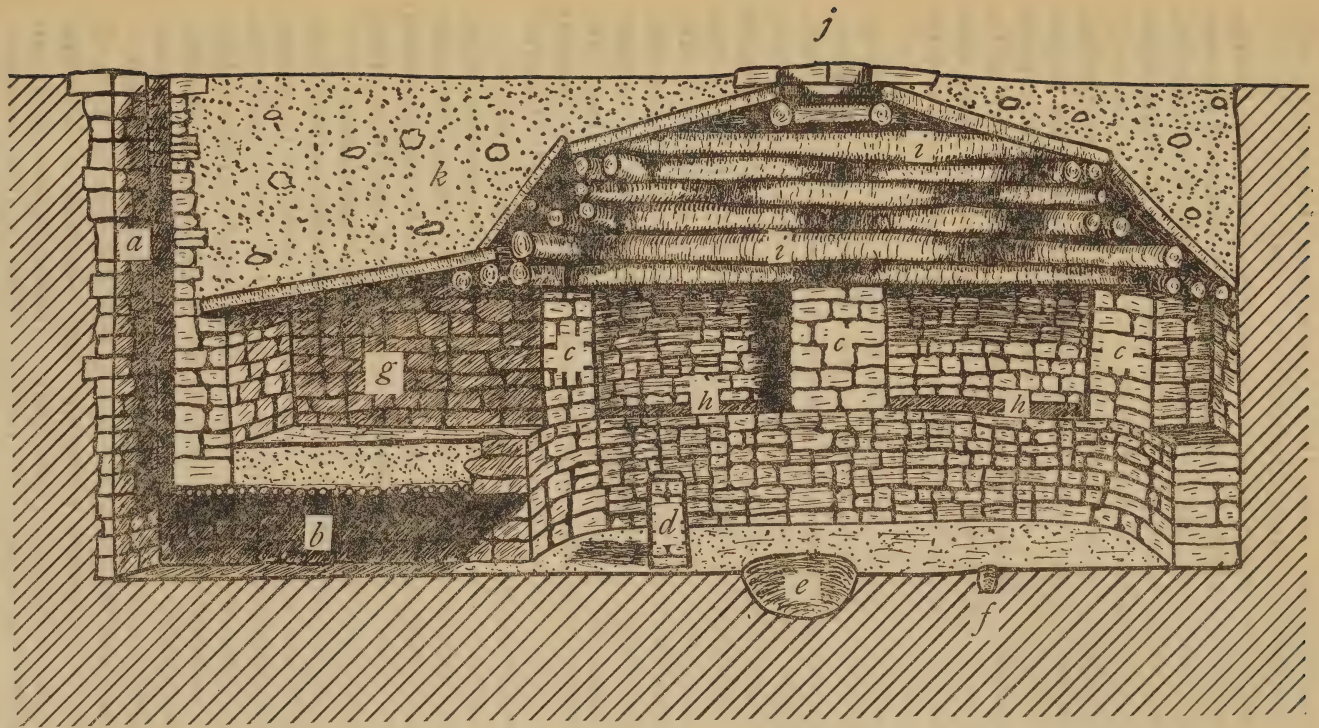

FIG. 26.—Construction of Pueblo-type kiva. One-clan structure completely subterranean in form. *a*, Ventilator shaft. *b*, Ventilator passage. *c*, Pilasters. *d*, Deflector. *e*, Fire pit. *f*, Sipapu. *g*, Recess above ventilator, postulated as survival in modified form of house compartment. *h*, Banquette. *i*, Cribbed roofing. *j*, Smoke hole. *k*, Earth fill. The ladder is omitted in this drawing. (After restoration by Prudden.)

was during the latter phase that the practice of inclosing the kiva within a rectangular room developed.

Following the Pueblo III period, the golden age of house-building cultures in the Southwest, there was a manifest tendency to return to the practice of building kivas separate from the main structures. The Hopi villages and some of those along the Rio Grande are present-day examples of this feature.

Characteristics common to most of the kivas (fig. 26) are the banquette or bench, pilasters to support the roof, a sipapu, fire pit, deflector or fire screen, a ventilator consisting of a vertical flue outside the wall and a horizontal passage opening into the room on the ground level, and storage boxes. Not every kiva has all of these features, but a majority of them are to be found in most of the structures.

Practically every feature noted above was in evidence in the remains of the houses excavated in the Chaco village. The early pueblo kivas in their detached state faithfully recorded the isolation of the earlier house type. The smoke-hole-hatchway and ladder combination was indicated in the dwellings but not actually found. The prototype of the banquette or bench was to be observed in the small shelf which was formed when the poles constituting the framework of the sloping upper walls were embedded in the earth back of the tops of the slabs which lined the pit. In a number of the houses the presence of this bench was quite evident. The sipapu, fire pit, deflector, and ventilator complex was an essential feature of all of the houses. The sipapu, even in the early domiciles, seems unquestionably to have been of a purely ceremonial nature.

The sipapu in the old houses and the later kivas was essentially the same. It was larger in diameter in the former but of about the same average depth. In the kivas it was generally kept covered when not in use during ceremonies and the fact that it was filled with clean sand in the houses may have the same significance.

Kiva fire pits show about the same characteristics and the same variations from structure to structure as do those of the houses. There was little difference in the form of the accompanying fire screen or deflector. In some kivas it was a single upright slab, in others it was constructed of poles and plaster, like the form described in connection with house F, while in others it showed the characteristics of the later period in that it was constructed of masonry.

The ventilator feature in the houses, as will be recalled from the discussion in a previous paragraph, was considered to be a true entrance, in most cases, rather than a ceremonial one or a mere provision for the securing of fresh air. That the kiva ventilator was a distinct survival of the original entrance seems beyond ques-

tion. That it eventually lost all of its symbolical significance, again became a purely utilitarian feature, and finally disappeared entirely sheds an interesting side light on changing primitive beliefs and practices. Whether the change from entrance to purely ceremonial and ventilating functions was a southwestern development or whether it is traceable to a possible common origin for the earth lodge is a problem still to be solved. Closely associated with this is another feature suggested in some of the Chaco village remains; namely, that of the possible existence of a ground level and overhead entrance in the same structure.

If, as is the generally accepted belief at the present time, the aboriginal inhabitants of North America drifted across Bering Straits from northeastern Asia there should be some possibility of finding explanations for certain phases of the problems of the Southwest in the region whence the people came. There is in that section of Siberia a number of peoples grouped under the name of Palae-Asiatic tribes. They are generally regarded as the survival of an older, fundamental stratum of population once occupying much larger territories but repressed into the northeast corner of the continent by the expansion of other peoples farther south and west.[44] All of these so-called Palae-Asiatic tribes formerly had or now have underground houses similar to those of the Koryak.[45] Although possessing distinct features of their own they have many characteristics in common with the New World forms. These similarities are so great that Jochelson refers to the structures as representing a type of Palae-Asiatic-American dwelling.[46]

There seems to be no question but that the type of structure is of considerable antiquity in that region and sections farther inland and it is highly probable that it is the outgrowth of a more primitive type which might also have been the ancestor of the New World forms. The similarities are too great to warrant any belief of an independent origin. Inasmuch as it is permissible to work from the known to the unknown, certain features of the Asiatic semisubterranean dwellings will be considered in order to determine, if possible, what light they may shed on the entrance, smoke-hole-hatchway problem in the Southwest.

The Koryak have a covered passage entryway with down-sloping floor, but in addition use the smoke hole as an entrance. There is not an indiscriminate use of the two, however. The entryway is the means of access to the house during the months from May to October and the smoke hole and ladder combination serves for the remainder of the year. This seasonal division is in part imposed

[44] Dixon, Racial History of Man, p. 334.
[45] Jochelson, The Koryak, p. 461.
[46] Ibid.

upon the peoples by climatic conditions. During the winter months snow piles up around the doors to the entrance passages and a continual removing of drifts would be necessary to keep them open. Hence, about the first of October they are closed.

Considerable religious importance is attached to the closing of the entrance and the erection of the ladder through the smoke hole. It is at this time that the new fire ceremony is held. During the months when the entryway is in use the ladder is removed from the hatchway and placed at one side of the house. Throughout the winter months when the outer doorway to the passage is blocked the passage itself serves as a ventilator. A small round hole is left in the roof of this part of the structure and fresh air is drawn down and into the dwelling in the same fashion as through the ventilators of the southwestern kivas.[47] We may assume, although it has not been proven, that this practice is the result of long-established custom which may have had its beginnings in the older structures, those ancestral to both the Old and New World forms.

On the basis of the above supposition it may be postulated that even after the peoples had reached the Southwest where climatic conditions were more favorable they continued the practice of using two entrances, one during the summer season, the other during the winter. Associated with the latter would be a continuance of the ventilator feature. Granting such to be the case, it would seem that the so-called ventilator was not of southwestern origin but goes back to certain features in the ancestral structures of northeastern Asia.

The twofold entrance complex also suggests an explanation for another characteristic in the kivas of the Southwest. The ceremonial chambers had, as a rule, but one entrance and that was the smoke-hole hatchway. The reason for this may be found in the fact that a majority of the more important ceremonies seem to have been held during the autumn and winter months when custom decreed that entrance be made through the roof. That there is a ceremonial relationship to the smoke-hole hatchway is shown among the Gilyak who always use a down-sloping side entrance to their structures, except at the performance of the bear festival, when they enter through the roof.[48] It has been suggested, however, that the smoke hole in the Gilyak structures formerly served as an entrance in the same way that it does in the Koryak houses.[49] The Kamchadal occupied their houses in the winter only and had no entryway, depending entirely on the smoke hole for access. Provision for ventilation was made by a trench leading out from the fire pit to one side of the house.[50]

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[47] Jochelson, op. cit., pp. 457–458.
[48] Ibid., p. 462.
[49] Jochelson, Past and Present Subterranean Dwellings, p. 121.
[50] Ibid.

The data available on this subject at the present time are too meager to permit the making of any definite statements, but it would seem that the foregoing paragraphs offer a plausible, although far from comprehensive, explanation for what may well have taken place in the development of certain features in the old dwellings and their survival in the kivas. It certainly is possible that the shift in entrance forms was due to some such cause and thus far there is no better solution to the problem than the one just suggested. Certain obvious gaps in our knowledge have been bridged by postulation and when actual evidence is secured it may be found that developments resulted from an entirely different combination of factors. Until such evidence is presented, however, conjectural suggestions, based on some facts to be sure, must suffice.

The pilasters which supported the kiva roofs were made of masonry, erected on top of the bench and against the wall. They no doubt represented the upright posts which had served in the same capacity for the superstructures of the early dwellings. In some of the Rio Grande pueblos actual posts were retained for this purpose.[51] The step which led from the post to the pilaster may be postulated from the evidence in house C, together with a certain amount of necessary deduction.

At house C, it will be recalled, the support posts for the superstructure were not placed in the floor of the room but had been set into the front of the wall, incorporated in the bench. The use of the actual posts continued for some time, for as Cummings observed:

> In the older kivas of the Cliff-Dwellers one finds the walls built of roughly constructed masonry with four strong posts set into them to serve as supports for the larger timbers that carry the weight of the roof.[52]

After the posts had been removed from the interior of the structure and had become a part of the wall it would be an easy matter, when masonry came into general use, to replace the wooden support by one of stone. Associated with this may be the curious practice of the Chaco Canyon people and their related builders of the Pueblo periods of inclosing a short beam or post in the masonry box which formed the pilaster.

It must not be inferred from the foregoing that all kivas had four pilasters, the number of support posts in the old house, because they did not. Many had 6, 8, and even 10. There is, perhaps, in this feature another illustration of the progressive growing away from

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[51] Castañeda records kivas in New Mexico which had wooden posts supporting the roof (Winship, Coronado Expedition, p. 520). While excavating for the Bureau of American Ethnology at the ruins of Llano, near Ranchos de Taos, N. Mex., in 1920, Mr. J. A. Jeancon (unpublished manuscript in Bur. Amer. Ethn.) uncovered a kiva which had had four supporting posts for the roof.

[52] Cummings, Kivas of the San Juan, p. 275.

old ceremonial practices. As the kivas became larger it was rather promptly discovered, no doubt, that a better roof could be constructed if more supports were used, and as a result the increase in number was adopted. Constructional requirements necessitated new developments. To carry this feature to its ultimate conclusion it may be stated that even in later times, when the actual posts and pilasters were no longer present, the roof being carried by the walls of the room, they were represented by lines drawn on the walls of the kivas.[53]

There apparently was a marked distinction between the type of roof found in the old houses and those of the kivas. This seeming difference may be attributable to the fact that we have no definite knowledge of what the central portion of the house superstructure was like and may have erred in postulating its flat form. Evidence indicated a tendency to such a roof, however. Granting this surmise to be correct, it is impossible at the present time to show the steps leading from the house to the kiva roof. Future investigations may bring to light the evidence necessary to settle the question definitely. Kiva roofs, we know, were generally cribbed. (Fig. 26.) That is, logs were laid from pilaster to pilaster, the row above was drawn in nearer the center of the room, the logs cutting across the corners of the first series, etc., until the framework had been built up into a sort of dome. The portion near the center generally had a flat surface bordering the smoke-hole hatchway. The proportion of cribbing to flat surface varies. In some a large part of the ceiling was flat while in others it was almost entirely dome-shaped. The cribbed feature persisted, however. The framework thus formed was covered with twigs, bark, leaves, earth, and plaster. It is possible, of course, that in some of the Late Basket Maker III houses the upper portion was slightly cribbed instead of being entirely flat. On the other hand, it is quite possible that the style of roof found on kivas was one of the characteristic developments of the Pueblo peoples.

One feature of the early houses which is missing from most of the later kivas is that of the compartment on the southeast side of the room. In a few instances, as in kiva H at Cliff Palace on the Mesa Verde,[54] a simple form of it, much like that of house F in the Chaco village, is in evidence. In such cases, however, there generally is a combination of the deflector and partition into a single wall. There is one characteristic in many of the small kivas of the San Juan area which may be a survival in modified form of this southeastern compartment. Above the ventilator opening in many cases there is a deep recess which completely fills the space between the

[53] Cushing, Zuñi Creation Myths, p. 365.
[54] Fewkes, Cliff Palace, p. 55.

two pilasters at that side of the room. In kivas without pilasters, which are found occasionally, the recess is in about the same proportion to the general size of the room as it is in those where it occurs between the pilasters.

Examples of the kiva recess are to be found in Prudden's unit-type ruins,[55] in a number of the kivas at Cliff Palace, Spruce Tree House, and other ruins of the Mesa Verde, at Kietsiel in northeastern Arizona,[56] and in some of the ruins of the Chaco Canyon. This feature has been suggested as being analogous to the raised section of the floor, the so-called spectators' bench, in the rectangular kivas of the Hopi,[57] and it may well be that the compartment in the old houses served the same purpose, namely, that those who were not occupied with the performance of the religious rites taking place in the main portion of the room gathered in the compartment where they could witness but not interfere with the ceremony. Such a use of the compartment might explain in part the tendency to higher walls at that side of the room.

Another interesting survival reported from the Mesa Verde is that of the use of upright slabs to line the kiva wall above the bench. This was found at the ruin called One Clan House which Doctor Fewkes excavated during the summer of 1922.[58] The same feature was also observed in Cottonwood Canyon, Utah.[59]

Many of the kivas at Pueblo Bonito, in the Chaco Canyon, had a wainscoting of small poles lining the wall between the bench and the roof.[60] This unquestionably was a survival of the small poles which formed the sloping upper walls of the superstructure in the old houses. They had no utilitarian value in the kivas and were not even apparent, as they had been covered completely with plaster. For some reason, however, the builders of the kivas seemed to think that their presence was essential to the ceremonial house.

The twofold use to which the kivas were put, their ceremonial functions, and their use as lounging and dwelling places for the men and older boys, may well be considered as an outgrowth of the time when the people both lived and performed their simple religious rites in the same structure. One point of difference, however, must be noted, and that is with respect to the women not being permitted in the later-day kivas. It would seem that they must have been

[55] Prudden, Circular Kivas in the San Juan Watershed, fig. 4, p. 45.

[56] Kidder, Southwestern Archaeology, fig. 12, p. 69. Fewkes, Preliminary Report Navaho National Monument, plate 13, p. 21.

[57] Fewkes, op. cit., p. 24.

[58] Fewkes, Archeological Field Work on the Mesa Verde, 1923, p. 105.

[59] Judd, Archeological Observations, p. 102, pl. 17, a.

[60] Pepper, Pueblo Bonito, figs. 26, 27, pp. 75–76. Judd, Archeological Investigations, 1921, p. 108, fig. 113; ibid., 1922, p. 137, fig. 130.

sharers, at least in part, in the rites and ceremonies taking place in the old houses. If such was the case it is plausible to believe that the spectators in the compartment portion of the room were the women and children who were denied an actual part in the proceedings but who, nevertheless, were permitted to remain inside the structure. The ultimate development of the special ceremonial room and the exclusion of the women from such places may have been a contribution by the incoming Pueblo peoples when they took over and adapted the general culture of the Basket Makers to their own needs.

Although the question of survivals in the essential features of kiva construction has been confined to a consideration of the houses of the Late Basket Makers it must be borne in mind that the latter structures owed much to older dwellings and it is quite possible that, as Nordenskiöld suggested, many of the characteristics go back to the days of the nomadic hut. When and how the change from the simplest form of shelters to the better earth-lodge type took place is not known. The earth lodge, with some variations, had a tremendous distribution. As previously mentioned, it can be traced all along the northwest coast, into Alaska, across into northeastern Asia and down the eastern coast of that continent and back into the interior. It was used extensively by later-day Indians in the Mississippi Valley region. Unquestionably it was a very ancient and quite common form of dwelling.

There are many points in the development of the kiva which can not be explained at the present time. One of the greatest problems in this connection is the relationship and cause for differentiation between the Chaco Canyon and Mesa Verde forms of kivas.[61] It is quite reasonable to suppose that as work in the prehistoric ruins of the Southwest progresses further evidence will be brought to bear upon this problem and that in time the whole story can be told. At the present about all that can be done is to show what features from the old houses actually did survive in the constructional characteristics of the small so-called clan kivas and what did not. Explanations must remain in the field of conjecture and such as have been presented in the preceding paragraphs were offered purely from that point of view. It seems quite evident to the writer, however, that the kiva of the Chaco village is not to be considered as the ancestral form of the small kivas of the later periods but of the large structures. The latter appear to have been for the major communal ceremonies while the lesser observances were held in the small kivas which are thought to be an outgrowth of the dwellings of this earlier period and the probable practice of holding minor rites in them.

[61] Hodge, Circular Kivas Near Hawikuh, pp. 33–34.

Storage Structures

Mention has been made of the storage cists, or bins, which were found associated with the dwellings of this period. They were simple in form and were constructed, on a smaller scale, in the same fashion as the dwellings. First a circular, oval, or, in a very few cases, rectangular pit was dug in the ground. The walls were then lined with stone or simply plastered and a superstructure of poles, bark, twigs, leaves, grass, and earth covered with plaster was erected over it. No support poles were placed in the interior as the structures were small enough to permit the slanting side poles to carry the weight of the roofing. The covering was probably cone-shaped, possibly in some cases it may have tended more to a domelike form, and in that way differed from the general type of covering indicated for the houses. Morris describes certain bins belonging to this period, which he found in Canyon del Muerto, as follows:

> Eventually we came to a large series of storage bins. These were rude inclosures of irregular form from 2 to 6 feet in diameter and of varying depth. Large, thin slabs of stone set on edge composed the walls, the joints of which were sealed with mud made tough with shredded bark, reed leaves, or corn husks. The roofs of only two were in place.
>
> Resting upon the tops of the slabs in each case was a juglike neck of adobe reinforced with sticks. The covers were slabs of stone worked down to nearly circular form. In one of the storage cists there were 700 ears of corn, which although thousands of years old, were as bright and fresh as if recently gathered.[62]

There were the remains of 48 of these storage bins in the village. All but four of them were excavated.

There was a great similarity in these small structures, although some individual differences were to be noted. Most of them were of the roughly circular or oval form but there were two, possibly three, which were distinctly rectangular in shape. All but four had been lined with slabs, and it is quite possible that at least one of these had been so treated but that the slabs had been removed. In five of them there had been a small bench at the top of the slabs. This was quite suggestive of the bench which was observed in some of the dwellings. There was a slight difference, however, in that the bench was a definite feature, intentionally constructed. A second row of slabs had been placed at the top of the circle, some distance back of the first row, and the flat space between, the top of the bench, carefully plastered. The superstructure had risen from behind the second row of slabs. (Pl. 9, *b*.)

There did not seem to be any definite plan for the location of these storage places. They had been placed at any convenient spot in the village, but at no great distance from the dwellings.

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[62] Morris, Exploring in the Canyon of Death, p. 270

Bin No. 1 (pl. 1) was located at the extreme northeastern end of the village close to the edge of the cliff. It was one of those with the bench-like feature. Due to weathering conditions at that point on the mesa top, most of the eastern side of the structure had been washed away. Where intact, the upper and outer row of slabs stood 1 foot (30.48 cm.) above the top of the bench. The latter averaged slightly over 1 foot (30.48 cm.) in width. There was a marked contraction at the southern side due to the conformation of the cap rock which projected above the surface at that point. From the top of the bench to the floor of the bin averaged 1 foot 7 inches (48.26 cm.). The floor was of stone, the cap rock of the mesa, which had been covered with plaster. The diameter of the lower portion of the bin averaged 5 feet (1.524 m.), while above the bench it was 7 feet 6 inches (2.286 m.). Almost touching the bin at the southeast side were the remains of a fire pit. The latter had had a depth of 1 foot 6 inches (45.72 cm.) and measured 2 feet 6 inches by 2 feet 6 inches (76.2 by 76.2 cm.).

Bin No. 2 was one of a group of three (pl. 1), the other two remaining unexcavated. The bin had closely approached the circular in form and had been lined completely with stone slabs, although one of them was missing at the time of excavation. The floor had been paved with large slabs, over which a coating of plaster had been laid. The pit measured 5 feet 6 inches (1.6764 m.) in diameter and the average height of the slabs was 1 foot (30.48 cm.).

Bin No. 3 was one of the few rectangular ones found in the village. (Pl. 1.) The pit had been lined completely with large stone slabs, all of which were in position when the débris which had accumulated in its interior was removed. This bin measured 6 feet 6 inches (1.9812 m.) by 6 feet (1.8288 m.). It had a depth of 2 feet 7 inches (78.74 cm.), which was a little more than the average found throughout the village. Its floor was the cap rock of the mesa which had been covered with a coating of plaster.

Little remained of bin No. 4 beyond the excavation which had been made to form the pit portion of the structure. (Pl. 1.) Only four of the slabs which had been used to line its interior were in position when it was uncovered. The marks made by the others when they were placed against the earth wall of the excavation were apparent, but the stones themselves were missing. When the original excavation was made it closely approximated a circle. The average diameter was 7 feet 6 inches (2.286 m.). Its average depth had been 2 feet (60.96 cm.). The floor had been composed entirely of plaster.

Bin No. 5 was one of the best preserved of those excavated in the village. It also had been one in which there was a small bench at

the top. (Pl. 10, *b*; fig. 27.) The upper ends of the slabs lining the lower part of the pit seem to have been flush with the old ground level while the upper ring of slabs extended above it. There was a decided slant to the slabs of the lower part of the pit. This gave it a cuplike form. The floor of this bin had been covered with a thick layer of plaster, but no slabs had been used to pave it. The average height of the slabs remaining in the upper row, part of which were missing, was 1 foot 2½ inches (36.83 cm.). From the top of the bench or shelf to the floor was 2 feet 2½ inches (67.31 cm.). The bench averaged 9 inches (22.86 cm.) in width. The diameter of the circle formed by the upper and outer row of slabs was 9 feet (2.7432 m.). The diameter of the inner circle at the level of the bench was between 7 feet and 7 feet 6 inches (2.1336 m. and 2.286 m.), while at the floor level it was 5 feet (1.524 m.).

Bin No. 6 was of considerable interest, although very little remained of it. (Pl. 1.) It had been used as a burial place for two dogs. The latter had been placed on the floor of the structure and the slabs from the side walls had been pulled out and thrown on top of the animals, after which the hole had been filled in with ashes, dirt, and general refuse. That there had been a distinct burial of these animals can not be questioned. Their positions and the fact that they had been covered with slabs from the wall of the pit showed that their interment had been intentional. In addition to this was the fact that beside the skeletons of the dogs were two small deer phalanges which had been painted with red ocher. This would suggest that the animals had been provided, as were human beings, with food in order that the spirit of the latter might sustain the spirits of the animals on their journey to the land of the lost others.

The burial of dogs seems to have been practiced to some extent by the Basket Makers, as Guernsey and Kidder found examples of it in the Kayenta district of northeastern Arizona,[63] and Morris found dogs in his investigation of Late Basket Maker sites in Canyon del Muerto in the same State.

The skeletons from bin No. 6 were submitted to Dr. Glover M. Allen, of the Museum of Comparative Zoology at Harvard University, Cambridge, Mass., who has made a special study of prehistoric Indian dogs.[64] The following observations on these bones were kindly contributed by Doctor Allen:

> The smaller one represents the breed which I assume to be the one named Techichi by the Mexicans. It is a very small breed of dog about the size of a Spaniel and apparently widely distributed in America in early times, or at least one similar to it. The other, larger specimen, is what I have called the Plains-Indian dog, a somewhat larger breed common in the Southwest and of

[63] Guernsey and Kidder, Basket-Maker Caves, p. 15, pl. 6, b.
[64] Allen, Dogs of the American Aborigines.

which I have seen a good many specimens from various excavations. The smaller dog is apparently rare among collections of bones dug up in excavating the pueblos.

Doctor Allen in his report on the Kidder and Guernsey dogs stated:

> These and other dog remains, are true dogs, in no way derived from coyotes or other native dog-like animals of America. Their forebears probably reached America with their human masters, but their Old World ancestors still remain to be determined.[65]

Close to the remains of bin No. 6 was a row of slabs which seemed to have formed a portion of the wall of a house, but there was so little of the structure left that nothing could be learned concerning it. This portion of the mesa had suffered to a greater extent from weathering than those sections farther removed from the edge of the cliff and for that reason there seemed to have been a greater destruction of house and bin remains.

Bin No. 7 was unique in the village. (Fig. 27.) There had been the usual excavation, but instead of having its interior lined with slabs it had been plastered and a ring of slabs had been placed horizontally around the top of its periphery. The walls, so to speak, had been capped with a single course of stone on the ground level. When this bin was constructed a portion of bin No. 8 was removed so that two of the slabs which had lined the latter formed a dividing wall between the two pits. Bin No. 7 seemed to have had a later date for its construction because the encircling slabs at the top were lying on débris which had accumulated after some of the neighboring pits had been dug. This bin tended more to the oval shape with diameters of 7 and 8 feet (2.1336 and 2.4384 m.). The average depth of the pit was 2 feet (60.96 cm.). The bottom of the pit was only 1 foot (30.48 cm.) beneath the old ground level, however.

Bin No. 8 had been one of the structures with an encircling bench or shelf. (Pl. 9, *b;* fig. 27.) At the time when the bin described in the preceding paragraph was constructed a portion of this bench had been removed to make way for the new structure. The lower part of the pit in No. 8 was completely lined with slabs, all of which were still in position when the accumulation of débris was removed from it. Its floor had been paved partially with small slabs of stone and heavy plaster covered the entire surface. The upper slabs rose 1 foot (30.48 cm.) above the top of the bench. The latter was approximately 1 foot (30.48 cm.) in width, although it narrowed considerably at the eastern side of the structure. From the top of the bench to the floor measured 1 foot 2½ inches (36.83 cm.). This gave a total depth to the pit of 2 feet 2½ inches (67.31 cm.).

[65] Guernsey and Kidder, Basket-Maker Caves, p. 45.

Bin No. 9 closely approximated the circular form and was in a good state of preservation. (Pl. 9, *b;* fig. 27.) All of the slabs which had been placed around the periphery of the excavation were still in place. The floor was paved with slabs and the latter had been, as in the case of the other bins with this feature, covered with adobe plaster. Bin No. 9 measured 6 feet 4 inches (1.9304 m.) on its north and south diameter and 6 feet 5 inches (1.9558 m.) on the east and west. The average height of the slabs above the floor was 1 foot 6 inches (45.72 cm.).

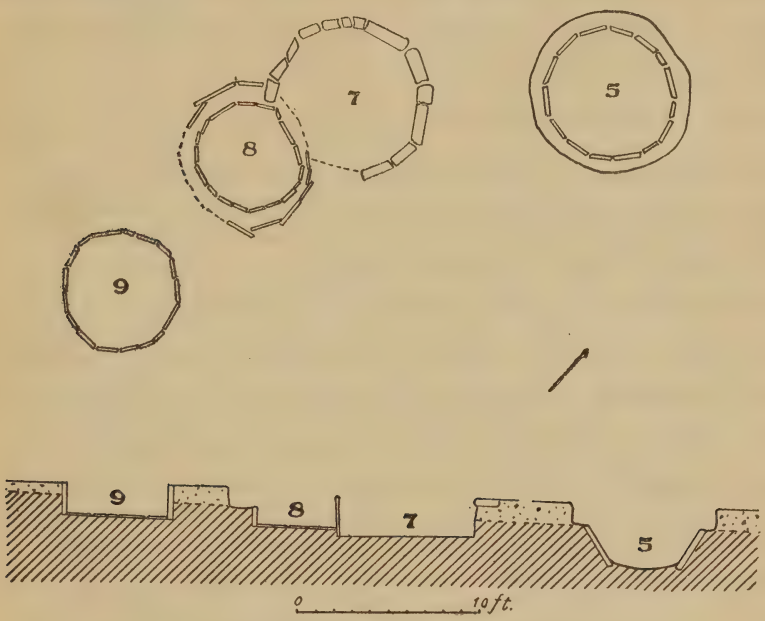


FIG. 27.—Storage bins Nos. 5, 7, 8, and 9

All three bins just described—7, 8, and 9—seem to have been built after the mesa top had been occupied for some time. This was shown by the fact that the excavations went down through débris of accumulation. It is quite probable that these three bins served house A, which was one of the last in the village to be occupied.

Bin No. 10 was one of the few in the village which approached the rectangular shape. (Pl. 1.) It was not as regular as No. 3, due to the fact that one end was slightly curved. Measurements for this structure were 3 feet 10 inches (1.1684 m.) by 6 feet (1.8288 m.), with an average height for the slabs which lined the pit of 1 foot 6 inches (45.72 cm.).

Bin No. 11 also approximated the rectangular form. It was not in a very good state of preservation, however, as all of the slabs which had lined the pit were missing from two of its sides. (Pl. 1.) That

they had been present was indicated by their imprints in the walls of the excavation. At a much higher level, and actually touching the south side of the pit, was a fire box. It is rather interesting to note the close association in a number of instances of these fire pits with the storage bins. It would have been impracticable, certainly, to build a fire in close proximity to a structure composed of poles, brush, leaves, and bark had the latter not been covered with a thick layer of earth and plaster. Because of the latter, however, fire could be used with a fair degree of safety almost against the structure. Bin No. 11 measured 6 feet 10 inches (2.0828 m.) by 7 feet 10 inches (2.3876 m.), with an average depth of 2 feet 6 inches (76.2 cm.).

There was a factor of some significance to be observed in the location of the fire pits near the corners of houses or close to storage bins. The general practice seems to have been to place them a little south or east of the former structures. This suggests, as previously mentioned in the discussion of the court, that the prevailing winds were probably from a westerly direction.

Judging from the slab-lined pit which remained, bin No. 12 had been a typical structure for the storage of corn or other products. (Fig. 23.) It had been roughly oval in form and was not very large. In addition to its function as a bin it had served as a partial windbreak for the court, which has been described in preceding pages. Bin No. 12 was completely lined with slabs originally, but when excavated during the process of uncovering the remains of Shabik'eshchee village it was found that some of the stones were missing. From the size of the pit, however, it was possible to determine its measurements. The latter showed that it had been 4 feet 10 inches (1.4732 m.) by 3 feet 10 inches (1.1684 m.). The average height of the slabs remaining in position was 1 foot 6 inches (45.72 cm.).

Bin No. 13 also formed a part of the windbreak at the west side of the court. (Fig. 23.) It was slightly different in shape from the majority of such structures in that the pit which had formed the subterranean portion was a long, narrow oval in contour. All of the slabs which had been used to line the excavation were in position. Measurements showed a long axis of 7 feet 6 inches (2.286 m.) and a short one of 3 feet (91.44 cm.). The average height of the slabs was the same as for the preceding bin, 1 foot 6 inches (45.72 cm.).

The third bin at the western side of the court, bin No. 14, was somewhat similar to bin No. 13, in that it was a rather long oval in shape. (Fig. 23.) The latter feature was not so marked in this instance, however. In length bin No. 14 measured 6 feet (1.8288 m.), while its breadth was 2 feet 10 inches (86.36 cm.). Its floor was

plastered and the side walls were slightly higher than those of the preceding two bins. The slabs averaged 1 foot 8 inches (50.8 cm.) in height.

Joining bin No. 14 at its south side was a much larger one which was rather irregular in shape and had had a second one built inside of it. Bin No. 15 appeared to have been discarded and allowed to fall into ruin, after which another and smaller one was constructed in its interior. The original bin had the most irregular shape of any in the village. This was rather hard to account for; in fact, no really plausible explanation for its contour presents itself. Some of the slabs which had lined the pit were missing and others had fallen from the wall to the floor. The outline of the pit was marked distinctly, however, and there can be no doubt but that its original shape was as indicated. (Fig. 23.)

Because of the large size of bin No. 15 it was thought for a time that it might have been an inclosure around the smaller structure in the center. When traces of roofing poles were found in the earth back of the slabs this supposition had to be discarded. Although nearly as large as some of the smaller dwellings there was nothing to indicate that it had been used as such. Hence it seemed that it should be included in the group of storage bins. It certainly was much larger than the average of these structures. Its measurements were 11 feet (3.3528 m.) by 8 feet (2.4348 m.), with an average depth of 1 foot (30.48 cm.). The latter was not as great as the depth for most of the bin pits. The smaller structure in the center tended toward an oval shape with diameters of 4 feet 3½ inches (1.3081 m.) and 2 feet 10 inches (86.36 cm.). Its slabs averaged somewhat more in height than those of the outer circle. Their tops were 1 foot 3½ inches (39.37 cm.) above the floor.

The interior of the pit for bin No. 16 had been finished in plaster only. (Pl. 1.) No slabs had been used in this structure. Not only was this true, but its depth was considerably greater than the average. This apparently was a characteristic of the plastered pits, as all of those excavated showed a greater depth than those lined with slabs. Bin No. 16 was 3 feet (91.44 cm.) deep and 6 feet by 6 feet 6 inches (1.8288 by 1.9812 m.) on two diameters. The difference in diameters was due to the fact that the northwestern arc of the periphery was considerably flattened.

Bin No. 17 was several feet west of No. 16 and in contrast to the latter, inasmuch as it was unusually shallow. (Pl. 1.) Slabs had been used in its construction and it had a slab-and-plaster floor. At the time of excavation a few of the slabs which had been placed around the wall of the pit were missing, but most of them were in position. The lower portion of the bin had a somewhat oval shape

and its diameters were 5 feet 6 inches (1.6764 m.) by 7 feet 3 inches (2.2098 m.). Its average depth was 10 inches (25.4 cm.). This was one of the shallowest pits in the village.

Between bins No. 16 and No. 17, and slightly closer to No. 17, was a small slab-lined fire pit. The stones gave evidence of having been subjected to considerable heat and the pit was filled with wood ashes. There were a few broken bones in the ashes. They were from a fairly large animal, probably an antelope or mule deer. They were no doubt the discard from some meal which had been prepared over and enjoyed near this particular fire pit. The latter was about the size noted for similar boxes. It measured 2 feet (60.96 cm.) by 2 feet 2 inches (66.04 cm.), with a depth of 1 foot (30.48 cm.).

Bin No. 18 was quite in accordance with the usual form. It was slightly oval in shape and had been lined completely with large stone slabs. (Pl. 1.) Not all of the latter were in position, however, at the time when the débris was cleared from its interior. The pit measured 4 feet 2½ inches (1.2827 m.) by 4 feet 10 inches (1.4732 m.) and had an average slab height of 1 foot 10 inches (55.88 cm.).

Midway between the kiva and the F houses was a group or cluster of three bins, Nos. 19, 20, and 21. Only two of them were cleaned out. (Pl. 1.) The third, No. 21, could be traced on the surface by the tops of the slabs which had been placed around the periphery of its pit.

Bin No. 19 measured 6 feet (1.8288 m.) by 6 feet 6 inches (1.9812 m.), with an average wall height of 2 feet (60.96 cm.).

Bin No. 20 was 3 feet (91.44 cm.) west and slightly north of No. 19. It measured 5 feet 10 inches (1.778 m.) by 7 feet 3½ inches (2.2225 m.). Its average depth was greater than that of No. 19. It was 2 feet 6 inches (76.2 cm.) from the tops of the slabs to the floor.

From measurements taken on the slabs at the surface of the ground the diameters of bin No. 21 were determined to be 6 feet 6 inches (1.9812 m.) by 7 feet (2.1336 m.). Due to the fact that it was not cleared of the accumulated débris which filled its interior, it was impossible to determine what its depth had been, but it is quite likely that it was approximately the same as for 19 or 20.

Bin No. 22 was located a few feet northwest of house G (pl. 1) and no doubt belonged to that structure. There was nothing different or outstanding about this bin. It was of the same general type as the majority and of about the same size. It, too, had been lined completely with slabs, and although all of them were not in position, the missing ones were lying on the floor in front of the space from which they had fallen. Bin No. 22 measured 6 feet 5 inches (1.9558 m.) by 7 feet 3½ inches (2.2225 m.) on two diam-

eters. The average height of the slabs above the floor was 1 foot 10 inches (55.88 cm.).

Another one of the bins in which there had been a small bench or shelf was found a short distance east of the antechamber for house F–1. (Pl. 1.) Bin No. 23 had a fairly circular pit partially faced with slabs. There was no question but what the entire wall surface originally had been so treated. This bin differed from those with benches previously described in that the bench was much lower and no slabs were used in its facing. The plaster floor ran up over the top of the bench and then continued up the wall and covered the slabs of the upper portion of the pit. The bench in the present instance could be more properly considered as such than those in the other bins in that it was only 10 inches (25.4 cm.) high. The slabs rose to a height of 2 feet (60.96 cm.) above the top of the bench. The bench itself had an average width of about 11 inches (27.94 cm.), although there was considerable variation in it from side to side. The diameter of the pit below the level of the bench was 5 feet 2½ inches (1.5875 m.) on its short axis and 6 feet 1 inch (1.8542 m.) on its longest axis. Above the bench the diameters ranged from 6 feet 8 inches (2.032 m.) to 8 feet (2.4384 m.). The floor of the pit was 2 feet 10 inches (86.36 cm.) below the original ground level.

Bin No. 24 was a rather small one located about midway between houses G and H. (Pl. 1.) The interior of the pit had a facing of slabs for the walls and a thick layer of plaster on the floor. The bin had been somewhat smaller than many in the village. The greatest diameter of the pit was 4 feet 2½ inches (1.2827 m.) and the shortest was 3 feet 3½ inches (1.0033 m.). The average wall height was 2 feet (60.96 cm.).

In close proximity to house G was another pit, the remains of bin No. 25. (Pl. 1.) Like No. 24, it had been quite small but its interior had been finished completely with stone slabs, both floor and walls, over which there had been a heavy coat of adobe plaster. Measurements showed its greatest diameter to be 4 feet 6 inches (1.3716 m.) and its smallest to be but 4 feet (1.2192 m.). Its walls were not quite as high as those for bin No. 24, as they rose but 1 foot 10 inches (55.88 cm.) above the floor.

Bin No. 26 was located well down on the slope of the mesa top some distance east and a little south of house J. (Pl. 1.) It had tended to the rectangular form, although its southeastern wall showed a distinct curve. A curious feature connected with the remains of this structure was the single slab which extended outward from the wall at its northern side. There did not seem to be any reason for the stone being in this position and there was no function, apparently, which it could have served. All that can be said is that

there was such a stone at that point. There was little difference in the two main measurements of the pit. The average length of the two straight sides, where the slabs were still in position, was 6 feet 6 inches (1.9812 m.). The tops of the slabs were 2 feet 5 inches (73.66 cm.) above the floor level. The floor in this structure was composed entirely of plaster.

Bin No. 27 was one of the few in the village which had not had the stone slabs as a facing for the walls of the pit. (Pl. 1.) A thick layer of plaster had been applied directly to the native earth and this seemed to have sufficed. The pit was slightly oval in outline, although it closely approached the circular. Its diameters on the long and short axes were 4 feet 6 inches (1.3716 m.) and 4 feet 3½ inches (1.3081 m.). Its average depth was slightly over 2 feet (60.96 cm.).

A combination of the two types of pits, the completely plastered and the one which was lined with slabs, was found in bin No. 28. (Pl. 1.) Here a few slabs had been used and the remainder of the pit had been treated with plaster only. The lack of slabs in part of the interior was not due to their having been removed but to the fact that they never had been used. No stone appeared in the floor, which consisted solely of a layer of plaster over the earth at the bottom of the excavation. Bin No. 28 tended more to the oval shape than did No. 27. Its long diameter measured 6 feet 8 inches (2.032 m.), while the shorter was 6 feet 3½ inches (1.9177 m.). The walls of the pit rose to a height of 2 feet (60.96 cm.) above the floor.

Bin No. 29 originally had been completely finished with stone slabs, but a number of them had fallen from the walls and were lying on the floor, while others were missing entirely. (Pl. 1.) The subterranean portion of this structure had been slightly more irregular in shape than its neighbors. In general, however, it approximated the oval-circular scheme followed in the construction of the majority of the bins. Its floor was composed entirely of plaster. It measured 6 feet 10 inches (2.0828 m.) by 6 feet 3½ inches (1.9177 m.) and had an average depth of 1 foot (30.48 cm.), considerably less than the average.

Situated about midway between the remains of houses H and K was the pit for bin No. 30. (Pl. 1.) This was another one in which the walls had been part stone and part plaster, bearing in mind the fact that even where stones were used they had been covered with a coating of plaster. In this case, as in that of bin No. 28, there was no indication that slabs ever had been placed in that section of the wall which was composed entirely of plaster. At the time when the structure was built there may not have been a sufficient number

of slabs available for use. The builders possibly did not feel inclined to work additional ones out of the cap rock of the mesa where it was uncovered near the edge of the cliff, so they were content to complete the surfacing of the walls with plaster. The floor also was composed entirely of the latter material. Bin No. 30 measured 5 feet 6 inches (1.6764 m.) and 5 feet 3½ inches (1.6129 m.) on two diameters. Its walls rose 1 foot 10 inches (55.88 cm.) above the floor.

Bin No. 31 had a pit in which the walls and floor were entirely of plaster, no slabs having been used in this portion of the structure. It was slightly larger than the preceding one but inclined to the oval in the shape of its excavation. (Pl. 1.) On its long diameter it measured 6 feet (1.8288 m.) and on the short it was 5 feet 6 inches (1.6764 m.). Its average depth was 2 feet 6 inches (76.2 cm.).

Bin No. 32 was 4 feet 6 inches (1.3716 m.) west of bin No. 31. It was more characteristic in its form in that the periphery of the excavation had been lined completely with stone slabs. (Pl. 1.) There was no paving on the floor, however. The latter consisted of plaster applied to the earth at the bottom of the pit. This bin was somewhat smaller than its neighbor. Its longest diameter was 5 feet 10 inches (1.778 m.) and its shortest 4 feet 6 inches (1.3716 m.). The average height of the slabs was 2 feet 6 inches (76.2 cm.), which gave the same depth to the pit as that of bin No. 31.

Bin No. 33, because of the system used in numbering these structures, was located at the opposite side of the village from the preceding one, No. 32. It was 26 feet (7.9248 m.) east of house N and possibly had been the storage place for that dwelling. (Pl. 1.) There was nothing exceptional or outstanding about the remains of this bin. It had been lined with slabs, several of which were missing when the débris was removed from its interior. Its size was within the average range for the village. Its longest diameter was 6 feet 8 inches (2.032 m.) and its shortest was 5 feet (1.524 m.). The average height of the wall slabs was 2 feet 6 inches (76.2 cm.).

Between houses K and L there was a cluster of bins, seven in all, which gave every indication of having been granaries for the latter dwelling. (Pl. 1.) They were not all contemporaneous, however, as one had been constructed in part over the remains of another.

The northernmost of this group was bin No. 34, which had the shallowest pit of any found in the village. It had a slab-paved floor and its walls had been of the same material, although several of the latter stones were absent when the remains were uncovered. (Pl. 1.) The floor of the pit had been but 5 inches (12.7 cm.) beneath the surface of the ground and the slabs in the walls had risen but 7 inches (17.78 cm.) above the floor, 2 inches (5.08 cm.) above the ground

level. The outline of the pit had approached the triangular in shape, although the sides were curved. The measurements for two axes were 5 feet 2½ inches (1.5875 m.) and 5 feet (1.524 m.).

The second bin in this group, No. 36, was almost due south of No. 34. It was one which had had all of the slabs which formerly lined its walls removed. Their imprints could still be seen in the earth, however, and there was no question but that they had been used. The pit was oval in form with a long diameter of 6 feet (1.8288 m.) and a short one of 5 feet (1.524 m.). Its floor was 4 feet (1.2192 m.) below the present surface of the ground, but its walls only rose 2 feet 6 inches (76.2 cm.) above the floor level. (Fig. 28.)

Bin No. 37 was of later construction, as was shown by the fact that a portion of it extended out and over the pit for bin No. 36. (Fig. 28.) It is possible that the slabs which had been used to line the latter were removed at the time No. 37 was built and that they were employed in its construction. No. 37 was quite similar in other respects to the rest of the bin pits on the mesa top. It had measured 5 feet (1.524 m.) by 5 feet 8 inches (1.7272 m.) and the average wall height had been 1 foot 7 inches (48.26 cm.). One reason for the belief that the slabs from the lower pit, that for bin No. 36, had been used in No. 37 was that the slabs in the walls of the latter, where it extended over the lower pit, extended about 10 inches (25.4 cm.) below the floor. Their total measurement was approximately what would have been required for slabs placed in the wall of the lower pit.

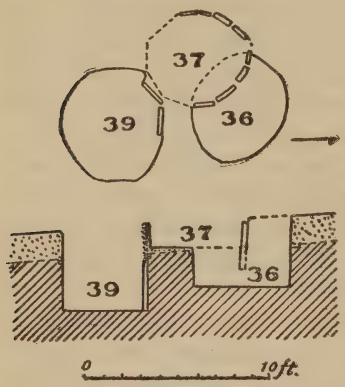


FIG. 28.—Storage bins Nos. 36, 37, and 39

Bin No. 38 had a typical slab-lined pit, although the latter was so small that it was at first thought to be an outdoor fire box. When it had been cleared of accumulated débris, however, it was found that there were no traces of fire in its interior and that it gave the general impression, one which was heightened by the indication of pole holes in the ground around its exterior, of having been the subterranean portion of a storage bin. The floor was of plaster and most of the plaster which had covered the surfaces of the slabs was still in place. The pit measured 3 feet 6 inches (1.0668 m.) by 3 feet (91.44 cm.) and had an average slab height of 2 feet (60.96 cm.).

The pit for bin No. 39 was one of the deepest in the village. (Fig. 28.) When the hole was dug it had been carried down to the cap rock of the mesa and the plaster floor was applied directly to it.

The slabs in the walls were 3 feet (91.44 cm.) in height. North-and-south diameter measured 5 feet 6 inches (1.6764 m.) and the east-and-west 6 feet (1.8288 m.).

The bin nearest to house L, in the entire group of seven, was No. 40. (Pl. 1.) It appeared to have been one of the older structures and all of the slabs which had lined the walls of the excavation, with a single exception, were missing. The stone paving on the floor was still intact, however. Measurements of the pit showed diameters of 4 feet 6 inches (1.3716 m.) and 4 feet 10 inches (1.4732 m.) and a depth of 2 feet 6 inches (76.2 cm.).

The largest and southernmost of the bins in this cluster was No. 41. It had been lined completely with stones, both the walls and the floor, and was in a good state of preservation when it was uncovered. (Pl. 1.) The floor was 2 feet 6 inches (76.2 cm.) beneath the present surface, but the tops of the slabs in the wall and the original surface were but 2 feet (60.96 cm.) above the bottom. On an east-and-west diameter the bin pit measured 7 feet (2.1336 m.), while the north-and-south axis was 5 feet 10 inches (1.778 m.) long.

Mention has been made of the apparent lack of contemporaneity of the seven bin pits forming the cluster lying between houses K and L. The evidence obtained during the excavations of these pits suggested that 36, 39, 40, and 41 had been built and used at about the same time, while 34, 37, and 38 were of later origin. The most conclusive argument for such a belief was noted in the relation existing between the ground levels at the tops of the pits. There was a distinct accumulation of débris of occupation between the surface of occupation at the tops of the first-named group of pits and the surface of occupation at the tops of the second group listed. A second point of interest was observed in the probability that bin No. 41 functioned in both groups. Consequently it may be assumed that while there were seven storage bins located at that part of the mesa top not more than four were used at any one time. This factor also might be considered as having a bearing on the matter of the two periods of occupancy in the village as discussed in connection with the character of refuse found in the kiva. It is quite possible that bins 36, 39, and 40 were the storage places for house K, which was one of the dismantled structures in the village. No. 41 might have been the last of the first group to be constructed and was in such a good state of preservation that it was retained in the later series.

Because it did not belong in the group of bin pits forming the cluster discussed in preceding paragraphs, bin No. 35 was not considered in its proper numerical order. As a matter of fact there is but little to be said of the remains of this bin. It was located at the

west side of the antechamber to house K and had been built against that structure. (Fig. 14.) There was so little left of it, however, that no description or measurements of it can be given.

Bin No. 42 was close to house O and no doubt had been the granary for that structure. It was in a rather dismantled state, as only two of the slabs which had been used in its construction were in place around the wall. (Pl. 1.) The floor, which was of plaster, was in a good state of preservation, however. This pit had an average depth of 2 feet (60.96 cm.) and on two diameters measured 4 feet 2½ inches (1.2827 m.) by 5 feet (1.524 m.).

Bin No. 43 gave indications of having had a bench similar to the few examples previously discussed. (Pl. 1.) It differed from the others in that the upper portion seemed to have been somewhat higher than in bins Nos. 1 and 8. The lower section suggested a complete bin in itself and it may be that the upper row of slabs had been added after the other had been in use for some time. Only three of the slabs which had risen above the top of the bench were in position when the débris which had collected in the interior of the pit was removed. The others had fallen into the pit and were found in the débris. The three slabs in position indicated that the bench at the top of the lower section of the bin had had an average width of about 6 inches (15.24 cm.). The slabs in the lower section had an average height of 2 feet (60.96 cm.), while those in the upper row stood 1 foot 6 inches (45.72 cm.) above the top of the bench. The floor of the pit was the cap rock of the mesa. The lower section was 6 feet 6 inches (1.9812 m.) on one diameter and 6 feet 8 inches (2.032 m.) on another. It was impossible to obtain the diameter of the upper circle of slabs, but if the width of the bench remained the same, or approximately so, around the periphery there would have been an increase of about 1 foot (30.48 cm.) over the diameters for the lower part of the pit.

One of the largest bin pits for the entire village was that for No. 44. (Pl. 1.) The latter was almost large enough to have served in the capacity of a small dwelling, but inasmuch as all of the features which have been taken to be characteristic of a domicile were absent it was thought that it belonged in the group of storage bins. No stone had been used in its construction. The walls and floor were composed entirely of plaster. Considerable sand had drifted over the remains of this structure since the days when it was in use. The original ground level, which was the level of occupation during the period of the structure's usefulness, was 1 foot 6 inches (45.72 cm.) above the floor, but the present surface is 3 feet (91.44 cm.) higher. The pit measured 8 feet (2.4384 m.) by 8 feet 6 inches (2.5908 m.) on two diameters.

Bin No. 45 was located at the extreme southern end of the village and at no great distance from house P. Perhaps it had been the storage place for that structure. (Pl. 1.) It had been lined with stone slabs but the floor was of plaster. In size and general contour it was quite similar to the greatest number of bin pits in the village. The average height of the slabs used to line its walls was 1 foot 6 inches (45.72 cm.). It quite closely approached the circular in form, except for the flattened northeast arc, and the north-and-south and east-and-west diameters were the same, 5 feet 10 inches (1.778 m.).

Refuse Mounds

There were two small refuse mounds, in addition to the deposit of waste material from the dwellings which filled the interior of the kiva, located at different points in the village. The largest one was between houses A and D. It partially covered the remains of house B and extended down the slopes of the mesa top south of A and east of D. Its peak was about midway between the two houses, where the total depth of the refuse was 4 feet (1.2192 m.). The second and smaller one was on the slope of the mesa east of house Q and bin No. 33. It apparently had been the place where the sweepings and other waste material from the houses at that end of the village were deposited. Its greatest depth was 3 feet (91.44 cm.). Its peak was about midway between the house and the storage bin but some distance east of a line connecting the two. (Pl. 1.)

In content, both of these mounds were characteristic of the whole southwestern area. They were built up of sand, ashes, charcoal, broken pottery, bones, fragments of bones, worn-out metates, broken manos, pecking stones used in dressing out the grooves of the metates, ordinary stone spalls, and the general débris resulting from the day-to-day life of such a community.

The inhabitants were rather casual in the disposal of their refuse material, as not all of it found its way to the mounds mentioned above. Here and there throughout the village were traces of such material, indicating that many times the housewife in her haste or indifference dumped her sweepings and other refuse at the first convenient place. A few of the bin pits suggested that they had been used for such purposes after their original function had been fulfilled.

Wishing to obtain, if possible, further confirmation of the break in the occupancy of the village which the débris in the interior of the kiva indicated, trenches were run through the two main refuse deposits and their strata studied. These revealed similar conditions.

In the largest mound there was a streak of clean sand, varying from a little more than 1 inch (2.54 cm.) in thickness at the periphery

of the heap to about 6 inches (15.24 cm.) at the center. There was some irregularity in its position in the mound, as one would expect when deposits are built up in the way that dump heaps are, but on the whole it averaged from 1 foot (30.48 cm.) to 1 foot 6 inches (45.72 cm.) beneath the top. This would indicate that quite a little refuse was deposited after the sand layer had been laid down.

There was also a layer of clean sand in the second mound. It was not as thick as that in the first but was fully as distinct. It varied from 1 to 3 inches (2.54 cm. to 7.62 cm.) in thickness and was from 6 inches (15.24 cm.) to 1 foot (30.48 cm.) below the top of the mound. With this evidence from three different parts of the village there can be little question of the existence of an interval during which it was unoccupied. The evidence showed that there was a greater deposition of refuse prior to the break, when the sand stratum was laid down, than there was afterwards. The kiva fill showed about an equal amount in each division but it is possible that the lower section was more compactly settled because of the water action on it. At any rate there was clear indication of a period of time when no refuse was being deposited at any of the three major places of disposal.

MATERIAL CULTURE

It is impossible to give a complete picture of the material culture of a group from the information gained by the excavation of a site such as that in the Chaco Canyon. At best a knowledge of their arts and industries, if their handicraft may be dignified to the extent of such an appellation, can be gained only in part. There was a vast quantity of objects used in the day-to-day life of the people which by their nature had a transitory existence. Baskets, sandals, articles of dress, wooden implements, and all things fashioned out of perishable materials would soon decay and crumble into dust. This is especially true when a village was located in the open and its ruins were exposed to the weather. Water from the summer rains and slowly melting snows of winter seeps through into the interior of structures, into graves and refuse mounds, and hastens the disintegration until the only antiquities which can be recovered by excavation are those of an imperishable quality. Because of these conditions all that could be recovered, upon which an appreciation of the skill and development of the inhabitants of Shabik'eshchee village can be based, were specimens of pottery, bone and stone implements, and ornaments fashioned from the latter materials. From information gained in the excavation of cave sites, where dry sand and the absence of all moisture has preserved most of the perishable objects

of the material culture of the Late Basket Makers, it is known that they were unusually adept in the manufacture of basketry, sandals, and various textiles. Consequently it is apparent that in the objects described in the following pages there is a decidedly one-sided record of the attainments of the people of that period.

Pottery

True pottery first made its appearance in southwestern cultures during the Late Basket Maker period. As was pointed out in the general introduction to this paper, unfired clay containers probably were known in the closing days of the main Basket Maker horizon, that of Basket Maker II, but the ceramic idea did not become fully developed until the following stage. At what point in the Basket Maker III period fired clay vessels became a component part of the cultural complex is not known, but the industry was well established ere the incoming Pueblo peoples brought the era to a close. Pottery of this period has been found in practically all sections of the San Juan archeological area and, despite certain minor local variations, its characteristic features remain so constant that there can be no question as to its representing a distinct ware with a definite style of decoration.

The pottery found at the Chaco village is quite crude when compared with that of the Pueblo periods which followed. It nevertheless was a true pottery, and has many features which were prophetic of developments which were to reach their culmination in following cultural stages. Only five complete vessels were secured, and one of these is a miniature bowl, but from the many fragments found a fairly comprehensive discussion of the ceramic art is possible. The fragments and vessels from this site show that although the industry had passed its elementary stages when the village was first occupied it had not attained to the higher degree of development apparent in the forms made just prior to the time when the people finally abandoned the mesa top. There was definite progress in this new occupation even during the life of this single community.

The ceramics at Shabik'eshchee village constituted a single distinct ware, but there are certain subclasses which may be made in the group as a whole. The most common classification for southwestern pottery, regardless of period, is one which is based primarily on function, a feature which is of essential consideration in that the form and general character of a vessel may be determined in large part by its intended use. On this basis all of the clay containers fall under one of two headings—culinary and nonculinary vessels. The

cooking pots are of three varieties, depending upon the period to which they belong. The earliest, those of the Late Basket Makers, were smooth surfaced; then came the banded neck forms of Pueblo I; and finally the vessels of the full Pueblo periods, II and III, whose entire exterior surfaces were covered with finely indented corrugations. The outside of these vessels is almost always black, due to their use over an open fire, but occasionally one is found which had not been put to its intended function and the color is a varying shade of gray.

The general characteristics of the nonculinary group in the San Juan area, regardless of period, may be summed up in the statement that the surfaces of the vessels are smooth and usually ornamented with some form of painted decoration. This class is made up of one major and two minor groups. The first is the well-known and widely distributed black-on-white pottery. The two minor forms are the red wares with black decorations and the vessels with a highly polished black interior.

Too hard-and-fast rules of definition should not be applied to the black-on-white group. The light-colored surface may vary from a dull shade of gray to a chalky white, while the pigment of the decoration may be any hue in the range from a brownish-red to lampblack. The latter was due, in great part, to the manner in which the vessel was fired. It is not attributable to a difference in the composition of the paint. On a vessel which had been properly fired the decoration would be a good black, while a slight amount of overfiring would result in a brownish-black and a marked overfiring would give a brownish-red hue.

The red vessels with black decorations had certain amplifications in the late prehistoric Pueblo period, when the black of the design was outlined with a white pigment, but this feature does not, of course, enter into the consideration of the pottery of the Late Basket Makers. There are other distinctions in the latter form which serve to differentiate it from the black-on-red of later periods. These features will be considered in a following paragraph.

The vessels with a polished black interior show two forms. One is the group of vessels with a gray to grayish-brown exterior while the other has a brownish-red exterior. The one seems to be an outgrowth of the other.

It must be borne in mind that where the manufacture of certain objects was a general household practice and not a specialized industry concentrated in the hands of a few people certain individual variations and off-forms occasionally will be found. These can not be fitted into any classification and for this reason must not be con-

sidered as vitiating the common attributes of the ceramics taken as a whole.[66]

Considering the ceramics from the Chaco village as a unit, regardless of shape, function, or decoration, there are certain features which may be regarded as characteristic. The clay used in their manufacture was comparatively fine grained. It was not difficult for the potters to secure this material because there are a number of deposits not far from the village site. The clay was not sufficient in itself, however, as a binder or tempering material was necessary to hold it together and to prevent its cracking in the process of drying and later firing. This temper apparently consisted of a fairly large amount of white sand. It was necessary to take great care not to use too much of the tempering material, because under such conditions the cohesiveness of the clay would be lost and the vessel would collapse.

The large amount of sand in the Chaco vessels shows that their makers were still in the developmental stages of the industry and that they had not yet learned that a smaller amount of tempering and a more careful kneading of the clay would give a harder, finer, and more compact texture to the paste. That a knowledge of this factor in pottery making was being attained, however, is shown by the difference between the potsherds from the lower strata of the various refuse mounds and those near the top. The former have a comparatively large content of sand and the paste is granular in cross section and quite friable. The later forms show a marked reduction in the amount of temper used, an improvement in the paste texture, and a lesser tendency to flake off. It is in this same connection that there is a characteristic difference between culinary and nonculinary vessels. The cooking pots, throughout the entire course of southwestern pottery making, had a coarser, more granular paste than the nonculinary group, a fact which adds to the validity of the two-group functional classification.

Under proper firing conditions the clay in the finished vessel became a light gray and even, on occasions, a rather good white in color. When the vessels were underfired a distinct dark streak was left in the center of the paste. Overfiring produced a yellowish cast which varied in intensity according to the amount of superfluous heat to which the vessel had been subjected. In fact, where the firing had been greatly in excess of the amount needed, there was a light orange-red tone to the surface. The earliest group of the red

[66] See Morris, The Beginnings of Pottery Making in the San Juan Area. Mr. Morris and the writer, working independently, arrived at the same conclusions and observed the same general features for the Late Basket Maker period. In order to simplify matters, however, Mr. Morris's classification is used because of the advantages accruing from an already published method of arrangement.

pottery seems to belong in this category. The color was not due to a red slip, as in the later periods beginning with Pueblo I, but to an intentional overfiring.

The surface finish on the vessels is rather rough. (Pl. 11, *a*, *b*, *d*, *e*.) The loops of clay from which they were made were obliterated by rubbing the pot, while it was still moist, with some implement, such as a corncob, piece of gourd, stick, bone, or stone, but the surface was not given the careful polishing which is so apparent in the wares of the later periods. An occasional piece gives evidence of having been supported in a basket while being built up and perhaps for decorative reasons the impression so made was not removed. (Pl. 12.)

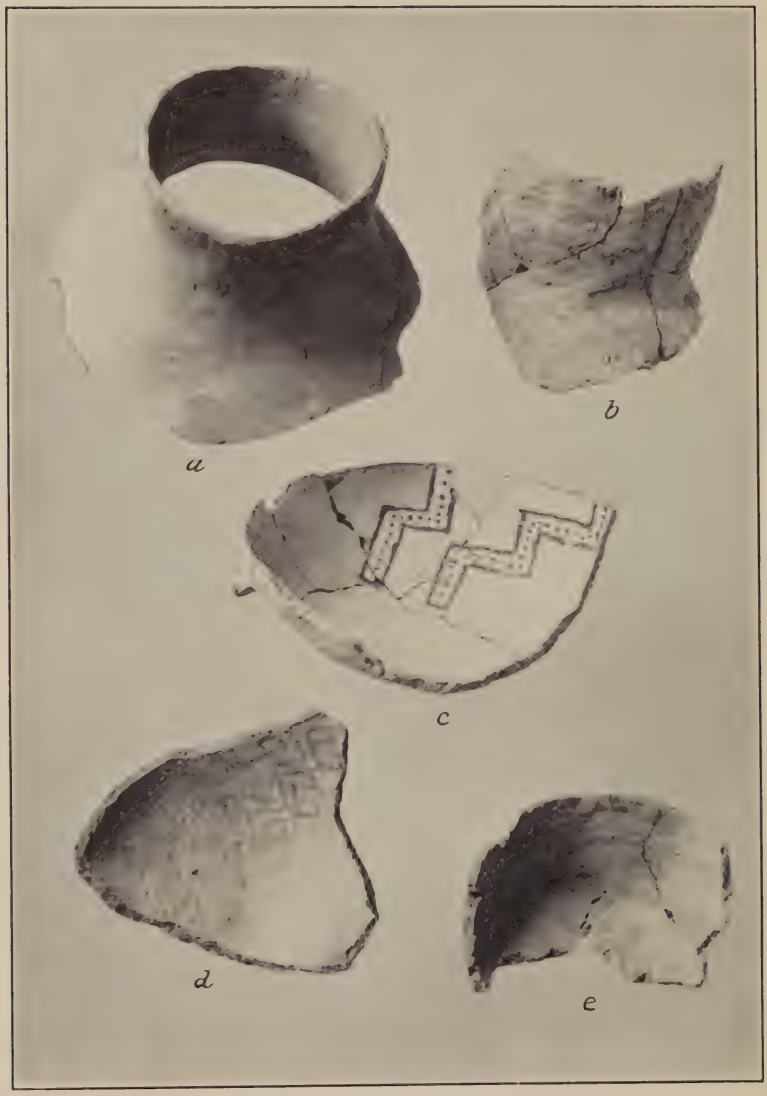
The practice of covering the surface of the rubbed-down vessel with a thin coating of "liquid" clay, the so-called slip, had not developed, and up to the present time no true specimen of Late Basket Maker pottery has been found with a slip. Vessels belonging to the group of painted wares occasionally give the appearance of having been treated in this fashion, but careful examination shows that they only have a pseudoslip. A probable explanation for this feature is that the paste of the vessel was quite moist when rubbed down and given its slight polish, and as a result the finer, more fluidlike material was brought to the surface. A similar condition may be observed when a cement sidewalk is smoothed down during the process of its construction. Because of the tendency for the finer material to work to the surface of the vessels the latter were given the appearance of having been treated with a very thin slip. The film of clay drawn to the surface in this manner did not completely cover the coarse grains of the tempering material and consequently the protruding particles impart a slightly roughened quality to it which is typical of the ceramics of the period. This feature shows quite clearly in the plates illustrating the pottery of the Chaco village.

Another characteristic feature of the surface treatment was the application of a red wash ("fugitive red" as it is known to the archeologists of the Southwest) to the exterior of vessels. Because it was not fired into the surface and made permanent it is not apparent, or else is very indistinct, on many of the fragments found. Potsherds picked up from the surface of the ground have lost it through the cleansing activities of snow and rain, but whenever fragments or vessels are found in protected places this red is quite noticeable. Many of the earlier investigators missed this feature entirely because they failed to study the vessels carefully before they were washed and cleaned in the laboratory. Such treatment will,

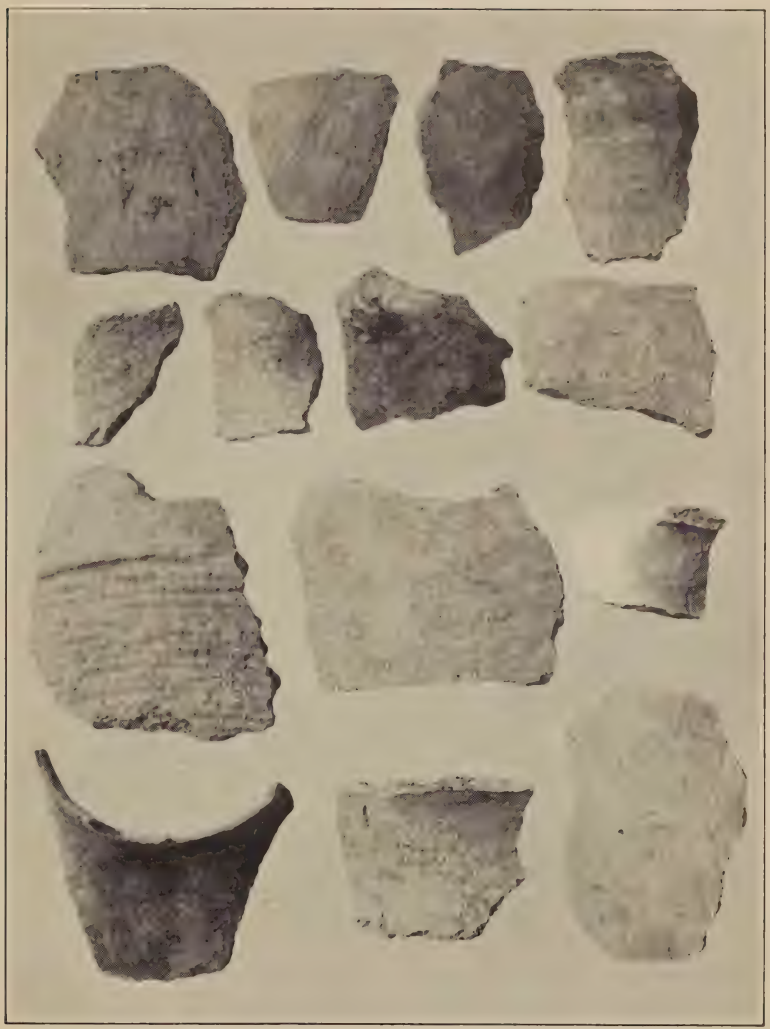
a, Bin No. 11

b, Bin No. 5

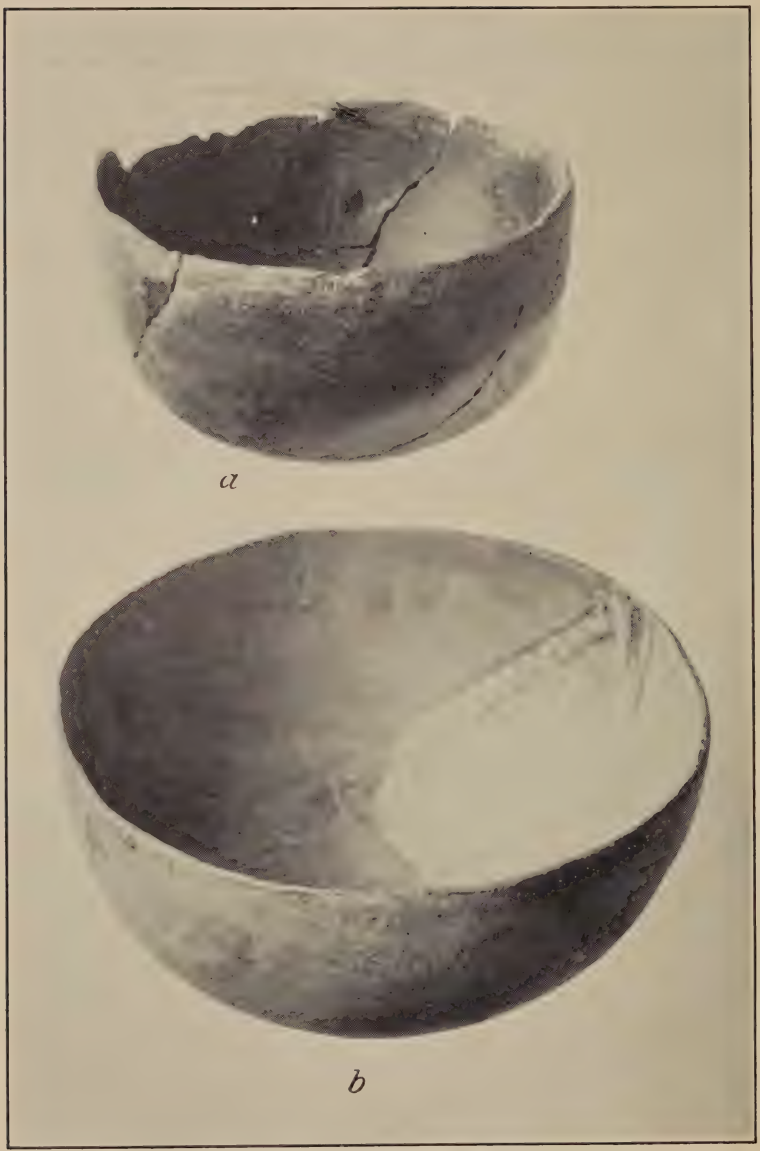
STORAGE BINS



POTTERY FRAGMENTS



FRAGMENTS FROM CULINARY VESSELS



BOWLS

a, Bowl with polished black interior *b*, Bowl with painted decoration

of course, remove the coloring matter. It is the impermanent character of the pigment which led to its name.

The "fugitive red" is observed most frequently on bowl exteriors, probably because there is a greater number of bowls and fragments from them available, but practically all forms had it. In many cases where the exteriors of cooking pots were not too heavily coated with soot from the fire traces of it have been found. In this respect the customs of the Chaco village potters differed somewhat from the general practice as noted by Mr. Morris. The latter reports it only

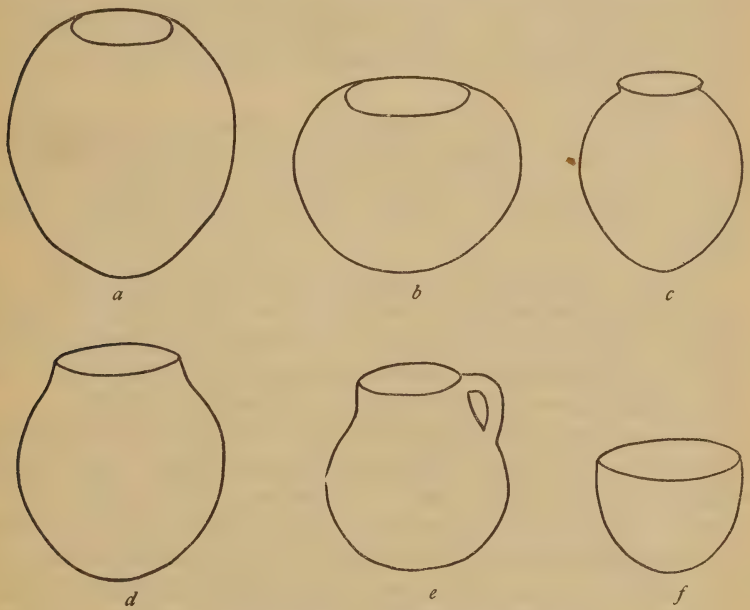


FIG. 29.—Outlines of culinary vessel shapes

on the nonculinary vessels.[67] Chemical analysis of the red pigment shows that its chief constituent was red iron ocher.

There was considerable variation in shapes even at this early stage in the development of the ceramic industry. From the fragments found it is clear that the potters made full-bodied jars with constricted necks; full-bodied vessels of an elongated spherical shape with wide orifice; globular or spherical pots with a slightly depressed top and wide orifice; globular vessels with a small circular opening at the top; bowls, pitchers, ladles, and small vessels with lateral spouts.

For culinary purposes the shapes most generally used seem to have been elongated spherical forms with slightly depressed tops and

[67] Morris, Beginnings of Pottery Making in the San Juan Area, p. 176.

wide orifices (fig. 29, *a*); the globular vessels with a depressed top and wide orifice (fig. 29, *b*); an egg-shaped pot with a small, slightly outcurving rim (fig. 29 *c*); vessels with a rather short, squat neck, wide orifice, and fairly globular body (fig. 29, *d*); some pitchers (fig. 29, *e*); and bowls (fig. 29, *f*). For some reason or other there seemed to have been a rather marked use of the latter at this village. This feature has not been observed generally in the vessels from such sites.

Absolutely accurate measurements of many of the forms can not be given because of their fragmentary nature but a fairly close approximation of their size can be determined, and the following figures are given with the understanding that they will be considered only in such a light.

The elongated spherical forms seem to have averaged about 10 inches (25.4 cm.) in height and 8 to 9 inches (20.32 to 22.86 cm.) in diameter. The orifice averaged about 5 inches (12.7 cm.) in diameter. The average wall thickness was one-fourth of an inch (6 mm.).

Globular vessels with a slightly depressed top and wide orifice averaged approximately 8 inches (20.32 cm.) in height and 10 inches (25.4 cm.) in diameter. The orifice averaged slightly over 5 inches (12.7 cm.) in diameter. The average thickness of the walls of the vessels of this group was the same as in the group above.

The egg-shaped pots with outcurving rims do not seem to have been very large. They ranged from approximately 6 to 9 inches (15.24 to 22.86 cm.) in height and 5 to 8 inches (12.7 to 20.32 cm.) in diameter. Their orifices averaged 3 inches (7.62 cm.) in diameter and the slight neck formed by the outcurved rim at the orifice was a little less than 1 inch (2.54 cm.) high. The average wall thickness of vessels of this group was three-sixteenths of an inch (4.5 mm.).

The globular pots with short squat necks averaged about 9 inches (22.86 cm.) for body height and 8½ inches (21.6 cm.) for body diameter. The average length of neck was approximately 2 inches (5.08 cm.) and the diameter of the orifice 5 inches (12.7 cm.). The walls averaged one-fourth of an inch (6 mm.) in thickness.

Only two pitchers, or pitcherlike forms, giving evidence of use for culinary purposes were found in the material from the village. They appeared to have been practically the same size. The average body height was 6 inches (15.24 cm.) and the body diameter was approximately the same. The necks averaged 2 inches (5.08 cm.) in height and the diameter of the orifice was 4 inches (10.16 cm.). The walls of the vessels averaged three-sixteenths of an inch (4.5 mm.) in thickness, while the bottoms were one-fourth of an inch (6 mm.) thick.

The bowls used for culinary purposes averaged 6 inches (15.24 cm.) in diameter and were approximately 4 inches (10.16 cm.) in depth. Sufficient large fragments from these vessels were found to make the figures here given quite accurate. These bowls had an average wall thickness of one-fourth of an inch (6 mm.). There was a slight tapering off of the wall near the rim which reduced the thickness at that point.

Vessels comprising the second group, the nonculinary containers, were found in the following shapes, listed in the order of their frequency: Bowls, pitchers, large jars with constricted necks and small openings, globular pots with small orifices, ladles, and fragments from vessels with lateral spouts. None of the bird-shaped vessels so common in sites farther north was found at the Chaco village.

Bowls seem to have been chiefly of the hemispherical shape, although occasionally there were vessels which were a little too deep for such a classification. (Fig. 30, *f*, *g*.) The rim was direct with a thin, rounded lip. In most cases it was rather uneven or undulating. The walls of the vessel were tapered off for a short distance below the rim, so that the measurements at the latter point were somewhat less than the average wall thickness. Bowl interiors were better finished than the exteriors. This was probably due to the fact that the decoration was confined in large measure to the interior of these vessels. In order that the maker might have a smoother surface upon which to paint her designs she undoubtedly gave that portion of the vessel her greatest attention.

In size the bowls ranged from those with a diameter of 4½ inches (11.43 cm.) and a depth of 2⅜ inches (6.04 cm.) to those with a diameter of 15 inches (38.1 cm.) and a depth of 9 inches (22.86 cm.). The main bulk of the bowls, however, ranged between 5 and 7 inches (12.7 and 17.78 cm.) in diameter and between 2½ and 3½ inches (6.35 and 8.9 cm.) in depth. The average thickness of the bowl walls was three-sixteenths of an inch (4.5 mm.). The bottoms were somewhat thicker, measuring one-fourth of an inch (6 mm.), while just below the rim the average thickness was one-eighth of an inch (3 mm.).

The material found during the progress of the excavations indicates that the people had two forms of pitchers. One had a globular body with a very short neck, outcurved rim, and wide orifice. (Fig. 30, *c*.) The other had much the same shape of body but a longer neck and more constricted opening. (Fig. 30, *d*.) In general appearance the first was much like the culinary forms. On both types the handle extended from the lip to the shoulder. A rather curious feature of the handles was observed in the fact that those on the first

type pitcher were broadly elliptical in cross section while those on the pitchers with definite necks had a cross section which was rather flat and quite suggestive of the so-called ribbon handles of later periods. One rather inexplicable quality is the general roughness

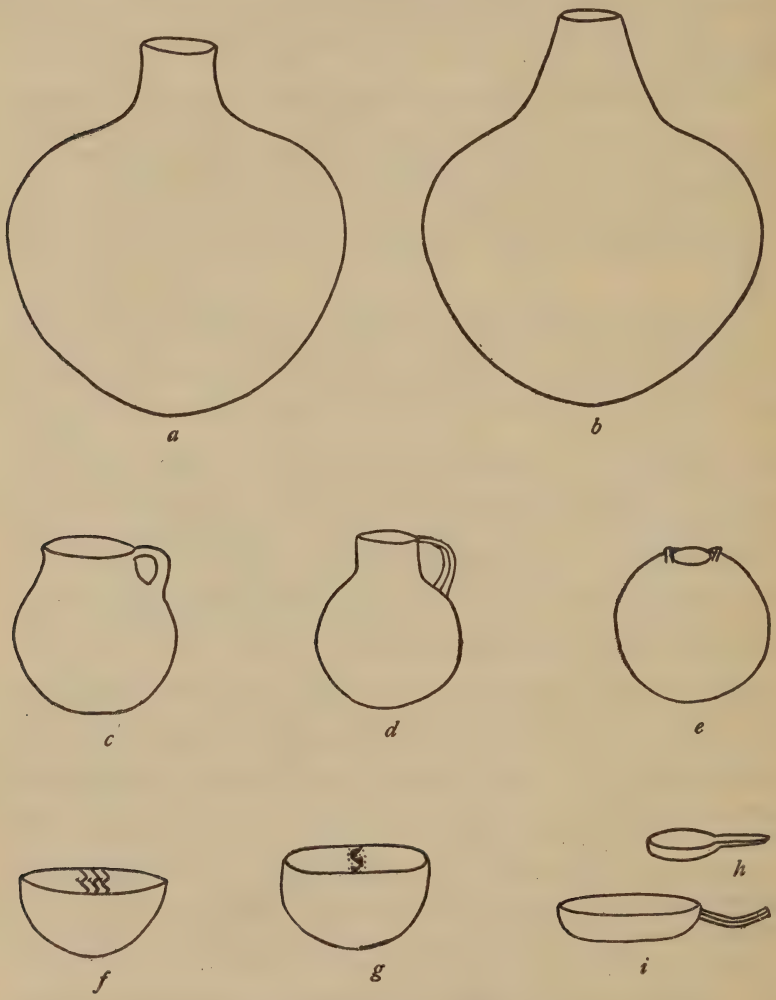


FIG. 30.—Nonculinary vessel shapes

of the surfaces of these pitchers. This is even more marked than in the general group of wares. Their outlines are fairly good, however.

The average size of the pitchers of the group with the very squat necks and wide orifices seems to have been about 7 inches (17.78 cm.) high, 7 inches (17.78 cm.) body diameter, 1½ inches (3.81 cm.) neck height, and a 5-inch (12.7 cm.) diameter of the orifice.

The second group averaged slightly more in height, having a total of 7½ inches (19.05 cm.), of which 2 inches (5.08 cm.) constituted the neck. The body diameter was 7½ inches (19.05 cm.). The diameter of the orifice at the top of the neck was 3½ inches (8.9 cm.). The average wall thickness for both groups was one-fourth of an inch (6 mm.).

Large jars, usually called water vessels, were represented by many fragments in the potsherds collected from the various dwellings and dump heaps of the village, but complete restoration of any of them was out of the question. A little more than half of one jar was secured, and fortunately most of the pieces were from the same side, so that a good idea as to its form could be obtained. As far as can be judged there was but one body shape for the vessels of this class. The lower portion, the section from the line of greatest diameter to the bottom, was between a half-oval and hemispherical form. The upper zone was generally slightly flattened and turned upward to form the tapering neck. The neck was a part of the vessel wall in this period but in later times it was made as a separate piece and fitted into the jar before the clay had completely dried. Enough neck fragments were found to show that there were two general forms. One was rather short and had a slight outcurve near the rim (fig. 30, *a*) while the other was long and tapered to a fairly small opening (fig. 30, *b*). There were no indications of handles for these vessels.

As far as measurements for this group are concerned there is considerably less data than for preceding forms. The one jar which was sufficiently complete to warrant attempts at determining what its size had been showed a total height of 16 inches (40.64 cm.), with a body diameter of 15 inches (38.1 cm.). The neck was 2½ inches (6.35 cm.) high and its orifice was 3 inches (7.62 cm.) in diameter. The walls averaged five-sixteenths of an inch (8 mm.) thick.

One of the forms which was quite characteristic of the Late Basket Maker period, although not numerically abundant, was the globular pot with small orifice. (Fig. 30, *e*.) In later periods the tops of vessels of this class were depressed, and in this form they have been called "seed jars," chiefly because the first examples found had seeds in them. In many instances these vessels had two small horizontal lugs with vertical perforations placed at opposite sides of the orifice. These could well have served as small handles. Thongs passed through the holes in the lugs would have enabled the owner to hang it up and thus give added protection to the contents. There is an interesting feature of technique in manufacture apparent when these vessels are compared with those of similar form made in the following periods. The earliest type, that belonging to Basket Maker III

and Pueblo I, had a characteristic treatment of the lip of the orifice which is in direct contrast to that of the later group. When the potter was completing the vessel the opening was smoothed by rubbing upward and outward from the interior. This left a slightly perceptible ridge which in most cases does not seem to have been obliterated. Just the opposite procedure was followed in later times, when the rim was smoothed from outside toward the interior.

Vessels of the globular form with small orifice ranged from 4 inches (10.16 cm.) to 8 inches (20.32 cm.) in body height and diameter. The commonest size seems to have been that which closely approximated a body height and diameter of 6 inches (15.24 cm.). The average thickness of the walls was three-sixteenths of an inch (4.5 mm.).

Representatives of two types of ladles were found in the fragments of vessels taken from the various houses and in the material obtained during the work in the refuse mounds. The most abundant form seems to have been one which approached the half gourd shape. (Fig. 30, *h*.) This type certainly was suggested by the vegetal form with which the makers were unquestionably familiar. The second type had a comparatively deep, oval bowl with a short, flat, solid handle. (Fig. 30, *i*.) The handle had a marked downward slant to it with a slight upcurve near its outer extremity. It was, in fact, slightly crescent-shaped.

As far as can be ascertained from rather scanty evidence the ladles of the type comparable to a half gourd averaged about 6 inches (15.24 cm.) in length. The handles were rather short and stubby with an average width of 2 inches (5.08 cm.) and a length of 2½ inches (6.35 cm.). The bowls of these ladles were fairly circular in contour with a diameter of 3 to 3½ inches (7.62 to 8.9 cm.). The bowls were very shallow, ranging from one-half to three-fourths of an inch (1.27 to 1.9 cm.) in depth. In some instances there was an indication of a slight ridge between the handle and the bowl. The average thickness of the vessels was three-sixteenths of an inch (4.5 mm.).

The second group had a larger average size, and while there is no definite evidence on the subject they seem to be of slightly later development. The paste and general treatment suggest such a belief. The oval bowl of the dipper in most cases closely approximated 6 inches (15.24 cm.) on the long diameter and 4 inches (10.16 cm.) on the short. The average bowl depth was 2 inches (5.08 cm.). The flat handle was attached to the bowl from one-half to three-fourths of an inch (1.27 to 1.9 cm.) below the rim. The handles ranged from 3 to 4 inches (7.62 to 10.16 cm.) in length and from 1 to 1½ inches (2.54 to 3.81 cm.) in width. They varied in thickness from

three-eighths to five-eighths of an inch (1 to 1.6 cm.). The walls of the bowls averaged three-sixteenths of an inch (4.5 mm.) thick, while the bottoms had an average of one-fourth of an inch (6 mm.).

The vessels with lateral spouts are among the most interesting features in the ceramics of the Late Basket Maker period. (Fig. 31.) Portions of two vessels, including the spouts, were all that could be found at the Chaco village, but the type is well known from other localities where complete specimens were obtained.[68] In general it may be said that the bodies of these vessels range from the globular to the oval shape, with slightly flattened upper zones. There is a small circular orifice at the top of the body. The spout projects from the side at about the point of greatest diameter and varies from a slightly downward to a slightly upward angle. None of the vessels was large. The globular portions range from 2¼ to 3½ inches (5.71 to 8.9 cm.) in diameter. The sprouts range from 1¼ to 1½ inches (3.17 to 3.81 cm.) in length. The wall thickness of the two Chaco fragments averaged one-eighth of an inch (3 mm.). What their use may have been is still a matter of question. Morris sums up the problem as follows:

FIG. 31.—Vessel with lateral spout

> In the earlier description, it was suggested that the object in question might have been a lamp because the tip of the spout was burned and disintegrated. Specimens subsequently exhumed do not confirm this belief; moreover, it is not probable that such vessels were fat-bowled pipes because they are neither caked nor blackened around the openings in the tops. Thus far, there is no evidence to clear up the question of function. Never in any later period does the hollow spout appear in San Juan pottery. Because of its many possible uses, it seems singular indeed that such a device, once originated, should not have been retained.[69]

The potters of Shabik'eshchee village made very little red pottery. Of all the vessels represented in the potsherds from the site there were fragments from but three bowls and one pitcher belonging to that group. It is impossible to tell from this material how large the vessels had been, what decorations they had, if any, and to what extent they differed from those of the so-called black-on-white series of the nonculinary wares. The potsherds do show, however, that their color was due to long firing and not to application of a slip containing coloring matter. The latter was used extensively in Pueblo I and following periods.

Conditions were more favorable with respect to the ware with a shiny black interior. (Pl. 13, *a*.) The greater part of one bowl was

[68] Morris, Beginnings of Pottery Making, p. 169.
[69] Ibid., p. 170.

found accompanying a burial, and large fragments, from a fourth to a half, from a dozen additional bowls are available for study. The latter indicates that as a group the vessels had a well-smoothed interior with a fairly rough exterior. There was a glossy black finish over the entire interior surface, while the exterior was gray with large black blotches.

Just how the potters of the period obtained the glossy black finish will never be known, but it is highly probable that they pursued methods closely allied to those of the present Pueblo Indians of the Rio Grande Valley in New Mexico. The latter make many black vessels by means of a smothered fire. The smothering of the fire causes dense smoke to penetrate the paste of the vessel, leaving a carbon deposit which gives the desired black. If these vessels are reburned in an open flame this black disappears.

The large splotches on the exterior of the old vessels were no doubt due to a lack of control in the smoking process. Except at the rim, where the thinness of the wall permitted the smoke to penetrate almost completely through the paste, there is only a thin surface of black on the vessels.

The exterior of one bowl found with one of the burials was somewhat different from those described in preceding sentences. It had a decidedly brownish-gray color, showing a closer approximation to the red vessels with a polished black interior which were to become fairly abundant in later periods. There can be no question but that, as Morris has observed [70] and as the specimens under consideration show, they represent the prototype of the later group of wares.

The Chaco village bowls formed a fairly uniform group, as the diameters varied only from 5½ to 8 inches (14 to 20.32 cm.). The majority deviated only slightly from a diameter of 6 inches (15.24 cm.). The depths ranged from 3 to 4½ inches (7.62 to 11.43 cm.). The average was 3¼ inches (8.25 cm.). The average walls were one-fourth of an inch (6 mm.) thick.

DESIGNS ON THE PAINTED POTTERY

The decorations on vessels made during the Late Basket Maker period at the Chaco village were confined largely to the interior of bowls and ladles, a practice common throughout the entire San Juan area. Fragments from one globular pot showing exterior decoration and single sherds from two large jars with a trace of design on them were found, but on none of the latter was there sufficient to indicate what the ornamentation had been. The interior of the bowls of the second type of ladle described, that of the bowl and handle

[70] Morris, op. cit., p. 186.

form, were decorated in the same fashion as the bowls. This is readily understood, however, as they really were, in a strict sense, bowls with handles attached. In the other type of ladle both the bowl and the handle were treated with some form of design on the interior. Occasionally the decoration was only in the handle portion, or vice versa.

The most outstanding characteristic in decoration seems to have been that of zigzag or stepped line elements. These appear on the interiors of bowls in combinations of 2, 3, and 4 parallel stepped lines. The figure generally bisects the bowl, although occasional tripartite and quadrate forms are found. In a majority of the designs there are tips of various kinds at the corners of the stepped lines and frequently the space between the lines is filled with a series of dots. (Pl. 14.) In a large number of the decorations there is a circle in the center of the design, at the bottom of the bowl. This circle and the parallel zigzag lines are without doubt the carrying over of elements found in the decorations on baskets made during the preceding cultural period. Baskets of this type were found at White Dog Cave by Guernsey and Kidder, and by Morris in the Canyon del Muerto.[71]

Plate 15, *a*, *b*, *c*, are simple forms of the stepped line, tipped corner elements, and are quite characteristic of the earlier decorations on bowls of the Basket Maker III period. This style of design was quite widespread in its distribution. Morris found bowls at contemporary sites in the La Plata Valley of southwestern Colorado with quite comparable designs on them. The chief difference between the one represented in Plate 15, *a*, and a somewhat similar decoration on one of Morris's vessels [72] is in the absence of secondary figures. On the La Plata bowl there is a further element in addition to and quite independent of the figure which bisects the field for decoration. Also, on Morris's bowl the tips at the angles of the zigzag lines are small triangles and not the T-shaped figures shown in this design. The second decoration (pl. 15, *b*) varies from its La Plata Valley counterpart in a minor detail also.[73] The tips at the corners of the stepped lines are further augmented by simple lines, whereas in the other vessel these embellishments take the form of small triangles suggesting pennants.

A typical example of the 3-line form of stepped parallel line design is illustrated in Plate 15, *c*. Another example is illustrated in Plate 11, *d*. A more complicated and less common form is shown

[71] Guernsey and Kidder, Basket-Maker Caves, pl. 24, a, b, f, h, i. Morris, op. cit., figs. 42 and 43.

[72] Morris, op. cit., fig. 39, b. Morris, Antiquities of Southwestern Colorado, pl. 65, c.

[73] Morris, Beginnings of Pottery Making, p. 191, fig. 38, b. Morris, Antiquities of Southwestern Colorado, p. 200, fig. 7.

in the next design. (Pl. 15, *d*.) Here the tips at the angles of the zigzags were extended in such a way as to interlock with those of the other lines, thus forming what at first appearance seems to be a rather involved decoration but one which is in reality fairly simple in its basic elements and one which runs quite true to form.

Characteristic examples of the stepped-line figures with dots are shown in Plate 15, *e*, *f*. The former is a common decoration, although there are slight differences in each design found. As an example of the tripartite method of ornamentation *f* is decidedly typical. A slightly different form of this style of decoration is also illustrated by one of the vessels which Morris has pictured.[74]

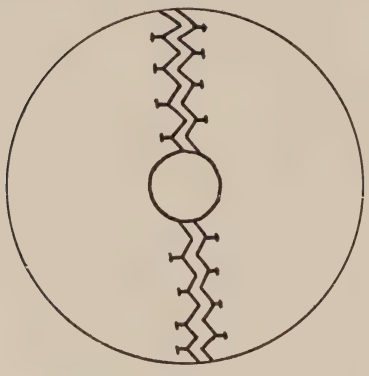
A different use of dots in the make-up of a design is to be noted in Plate 16, *a*. The painter of this decoration used two straight-line panels meeting the circle at the center of the bowl. The dots were placed inside of these framing lines, as in the previous examples, but instead of the rather hit-or-miss fashion they were so arranged as to form a zigzag line. The ticks jutting out from the framing lines of the panels are quite often observed in the designs of this period. Still another use of dots is depicted by the next design. (Pl. 16, *b*.) Here they were used to outline figures composed of stepped lines embellished by triangular elements. This seems to have been a favorite form of decoration at the Chaco village, as potsherds from many different bowls were found bearing portions of such designs. (Pl. 14.) It was fortunate that enough fragments were recovered from this particular bowl to make possible the complete restoration of the design.

The quadrate form of decoration is illustrated in Plate 16, *c*. Fragments from several different bowls were found bearing this type of design. There seems to have been considerable variation in the number of small figures placed inside the framing lines. Morris found one example with a single row of them,[75] while fragments from the Chaco village show two and four rows as well as the triple-row example pictured in the drawing. Potsherds from two different bowls show that these rows of small figures were occasionally used without accompanying framing or border lines.

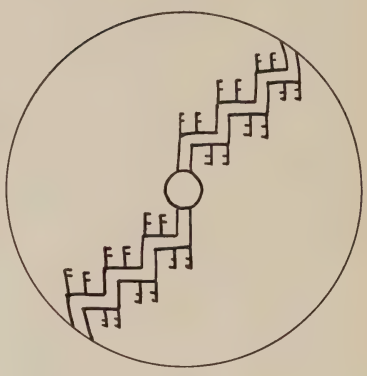
A decoration which, up to the present time, stands as a unique example in the designs of this period is depicted in Plate 16, *d*. It was necessary partially to restore this design, but there can be no question as to its correctness, as fragments representing a considerable portion of the bowl were recovered. The pairs of zigzag lines embellished with triangular figures are quite suggestive of the somewhat similar element in the decoration above. (Pl. 16, *b*.) The other fig-

[74] Morris, Beginnings of Pottery Making, p. 175, fig. 25, d.
[75] Ibid., fig. 25, a.

POTSHERDS WITH PAINTED DESIGNS, BLACK-ON-WHITE SERIES



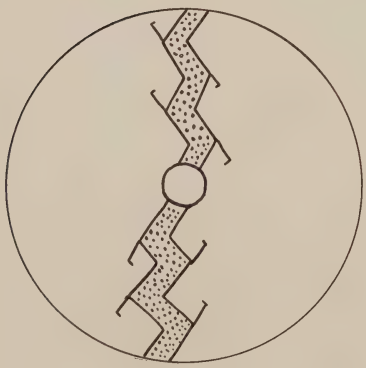
a



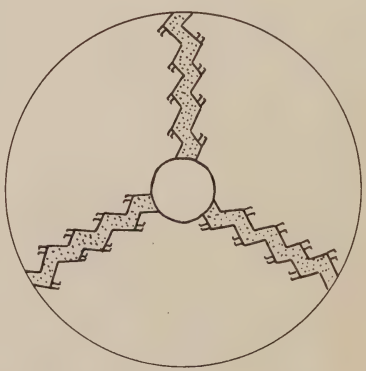
b

c

d

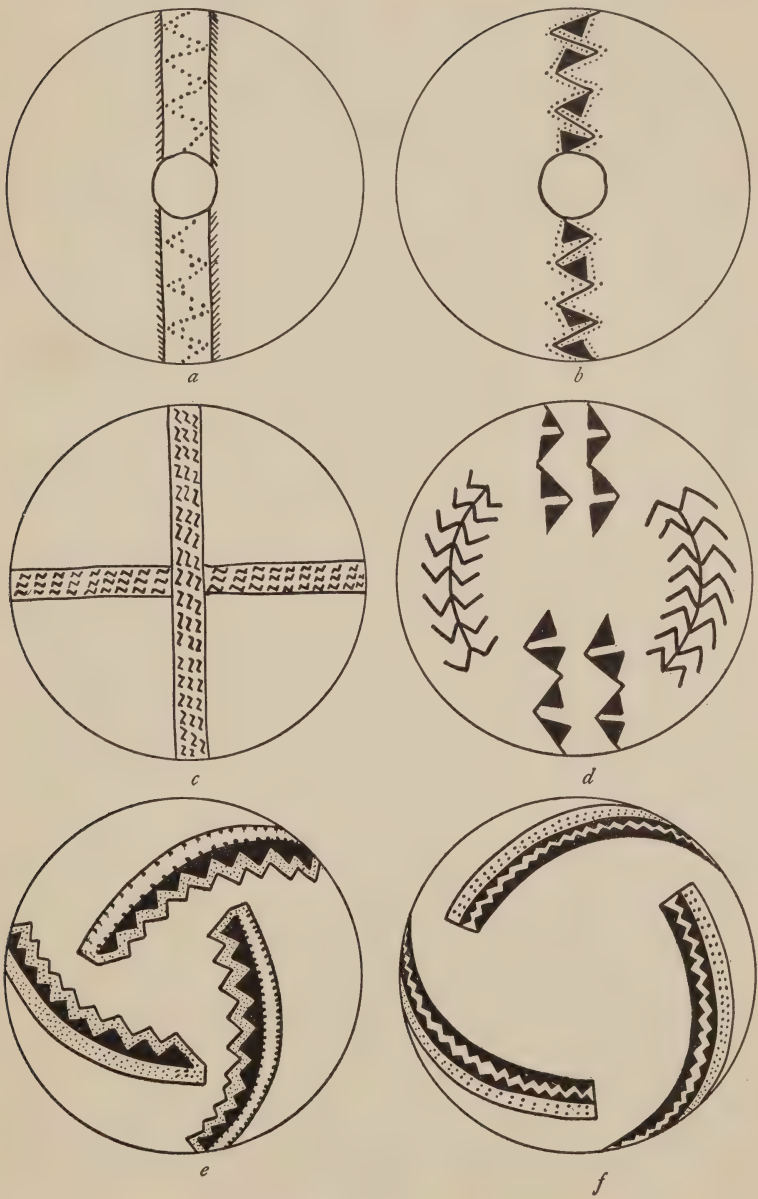


e



f

DESIGNS FROM BOWL INTERIORS



DESIGNS FROM BOWL INTERIORS

BOWLS

a, Undecorated. *b*, With painted design.

ures, on opposite sides of the field of decoration, are quite interesting in form and may possibly have been painted there to represent centipedes. It is not unusual to find this life form represented on wares of later periods.

The last two designs figured, Plate 16, *e*, *f* (see also pl. 13, *b*), are good examples of the triple-panel style of decoration in which the panels, pendent from the rim of the vessel, tend to cut across the field of decoration in an oblique direction. In outline the panels tend somewhat to the curvilinear form. Both of these designs illustrate additional combinations of the zigzag lines, dots, and triangular elements. In *f* there is a suggestion of the so-called lightning symbol. As a matter of fact it may be considered in the light of a variation of the zigzag-line element. But, in this case it takes a negative form, owing its presence not to the actual lines but to the borders formed by triangular figures. Neither of the latter designs represents a form common in the decorations of this period, but the style became quite popular, in slightly modified forms, in the periods immediately following.

Only one example of a true band decoration was found on pottery from this site. This design consists of a series of triangular figures pendent from the rim of the bowl. (Pl. 17, *b*.) The latter was found in the protokiva house excavated during the work of the preceding summer. Band designs are rare in the earlier stages of the Late Basket Maker ceramic phase but occur occasionally on specimens made toward the close of the period.

Although the decorations on the vessels of the Late Basket Makers are predominantly of the geometrical type, occasional realistic designs are to be observed. Except for the centipedelike figures previously mentioned, the specimens from Shabik'eshchee village do not contain a single complete example of the realistic art. There are tantalizing fragments on which may be seen the feet of a bird, portions of some animal, and even suggestions of human beings, but in not a single instance is there enough to make restoration possible. Half of one bowl bearing two humanlike figures was found a number of years ago in a rincon across the canyon from Pueblo Bonito by Mr. Morris. The remains of this vessel show that it belongs unquestionably to the period under discussion and in order that some idea may be had of the nature of the life forms in decoration a drawing of it is included in this report. (Fig. 32.)[76] The square-shouldered, triangular-bodied figures are very characteristic of the Basket Makers. At many sites quite similar forms have been noted

[76] University of Colorado Museum, Boulder, Specimen No. 744.

painted on the walls of caves and on near-by cliffs.[77] This bowl also illustrates another variety of the quadrate form of decoration. The panels which marked off the field for decoration into four segments were composed of elements which are quite charactertistic of both textile and ceramic designs. This element is observed frequently and many of the fragments of pottery from the Chaco village showed portions of designs in which it had been used. The characteristic circle drawn in the bottom of the bowl is very apparent in this specimen. It is quite likely that the other half of the vessel contained similar figures. That the missing portion had been divided by a panel is shown in the traces of the latter which are present near the central circle.

FIG. 32.—Painted design from half of a bowl

The use of life figures in the decoration of bowls is not at all surprising because such representations frequently are found on baskets of the preceding period.[78] It is quite apparent that from the beginning of the manufacture of painted vessels both geometric and life forms were used in decoration and that the two forms existed side by side. That one did not grow out of the other or result from it in the early development of southwestern designs is certain. Another interesting feature is that practically all of the life figures on the pottery of the early prehistoric periods are almost identical with the drawings on the cliffs throughout the area. In very late times, it is true, life forms became highly conventionalized, and there are the many so-called bird symbols on the Rio

[77] Kidder and Guernsey, Archeological Explorations, pp. 197–198, figs. 100, 101, pl. 96, a, b. The writer has observed such figures in several places along Montezuma Creek in southeastern Utah. The latter were pecked into the rock, however, and not painted. They were close to Basket Maker III sites in each instance.

[78] Pepper, Ancient Basket Makers of Southeastern Utah, pp. 13, 15. Guernsey and Kidder, Basket-Maker Caves, Plate 26, c.

Grande wares, the butterflies and moths, and birds of the Hopi, and other involved symbols, but they are all long subsequent to the forms at present being considered.

There is one feature in the decorated wares of the period which is rather marked, and that is the painted rims of the bowls. In a great majority of cases the lips of the bowls were so treated, producing what may be considered as a frame for the entire design. Unfortunately the rims have been so rubbed and chipped that it is not possible to tell whether or not the break, which is so apparent on vessels of later date, was present. The line break consists of a small unpainted space on the rim. It is explained on the basis of the belief among some of the modern Pueblo Indians that if the line was made a complete circle the spirit of the vessel could not pass in or out.

In the foregoing discussion no attempt was made to read mysterious and profound meanings into the so-called symbolism of the pottery decorations. Inasmuch as such a treatment of prehistoric decorations would be largely guesswork, the writer has neither the inclination nor the qualifications necessary for such a study. Mystic numbers apparently played but a small part in the decorative combinations. Series of elements from 1 to 10 may be found on the same piece of pottery. It is true that certain numbers or combinations of numbers are found more frequently than others, but as to their having symbolical significance there is a question. One might find an infinite variety of reasons to explain why 1, 2, 3, and 4 figures were used in a decoration and none of them would really tell what the maker had in mind. It was probably discovered that certain combinations fitted into a certain design better than any other number and they were used for that reason and not because they were felt to symbolize some esoteric factor in the religious beliefs of the people. Such explanations, like the reasons for certain features in the kivas, probably were thought of long after the symbol or design had come into use. It is the opinion of the writer that there has been too great a tendency on the part of the dilettante and amateur in archeology to read deep and mystic meanings into things which should not be so considered and the field of pottery designs has been one in which their imaginations have run riot.

As an example of what the Indian thinks of the elements in a design and their symbolic nature, the findings of one investigator among the Pueblos of the Rio Grande are interesting.[79] When questioned as to the meanings of certain figures the replies were often evasive and the Indians were frankly puzzled as to what the interrogator wanted. When meanings were obtained for a symbol

[79] Guthe, Pueblo Pottery Making, pp. 85–88.

from more than one woman they were generally different. The meanings obtained are usually the result of insistent questioning. The potters had never definitely given an interpretation to their designs until asked many times to do so. Then they strove to please the investigator with some sort of an explanation. There are some definite representations but no questions need be asked concerning them. The clouds, the lightning, life forms, all speak for themselves. Their meaning is so plain that there can be no doubt with regard to them. It is in the geometrical figures where attempts are most frequently made to read what in the majority of cases is not present.

The characteristics of the pottery as a whole may be summarized briefly as follows: The vessels are gray, brownish-white, white, or orange-red in color. They have slightly pebbled surfaces, due to projecting particles of the tempering material used in the paste. The decorated vessels have a thin pseudoslip which resulted from additional rubbing of the unfinished vessel. There was a marked use of dots, tipped, stepped lines and solid triangular figures in the designs, together with a small circle at the bottom of the bowl. The majority of the forms represented at the Chaco village belong in what Mr. Morris has termed the "Standard complex," which is characteristic of the normal phase of the ceramics of the Late Basket Makers.[80]

Additional Clay Objects

Pottery containers were not the only fired-clay objects uncovered during the excavations. There was a second group consisting of clay pipes or cloud blowers. (Pl. 18.) The latter name has been given to the objects of this type because the modern Pueblo Indians use similar ones for ceremonial purposes. During the progress of certain religious observances small puffs of smoke, supposedly representing clouds, are blown to the cardinal directions by priests using pipes of this form. It can not be ascertained, of course, whether the ancients used them for the same purpose or not, but it is quite logical to suppose that they did. They certainly would be an inconvenient form of pipe to smoke for pleasure. They tend to the tubular or elongated funnel shape. A short hollow reed was placed in the small end to serve as a stem. The bowl portion, if such it may be called, in the present specimens is very shallow; in fact, it constitutes only about one-fourth of the total length. The remainder of the object is solid, except for the small hole running through it from the bottom of the bowl to the small end. Two complete specimens and a third which is practically complete give a fair idea as to the general size of these objects.

[80] Morris, Beginnings of Pottery Making, p. 161.

The cloud blower figured in Plate 18, *b*, measures 2¼ inches (5.7 cm.) in length. Its diameter at the bowl is 1 inch (2.54 cm.), while the depth of the latter is one-half inch (1.27 cm.). The second one, *c*, is somewhat smaller than the other two. Its total length is 1¾ inches (4.44 cm.). The diameter at the bowl is seven-eighths of an inch (2.22 cm.). The latter's depth is one-half inch (1.27 cm.), which is somewhat greater in proportion to the length than in the other two specimens. The third one, *d*, is 2 inches (5.08 cm.) in length. The bowl end has a diameter of $1\frac{3}{16}$ inches (3 cm.) and a depth of three-eighths of an inch (1 cm.).

A unique form of cloud blower is pictured in Plate 18, *a*. In this instance there was a single bowl with two stems. The writer has never seen or heard of such a form coming from the Southwest. There is no question but what it had been used as a pipe, because the interior of the bowl is burned. In fact, when it was dug out of the southeastern corner of the compartment in house D there was still a thin crust of residue, the cake, lining its interior. Both stems are perforated. The stems are so nearly the same length that there is no appreciable difference between them. The total length of the object is 1⅞ inches (4.76 cm.). The bowl is elliptical in contour. The long diameter is seven-eighths of an inch (2.22 cm.) and the short is five-eighths of an inch (1.58 cm.). The bowl depth is one-half of an inch (1.27 cm.).

A portion of another cloud blower, about one-half of the stem end, is interesting because it was decorated with a zigzag line formed by a series of dots. The latter were not painted on but had been punched into the surface before the object was fired, when the clay was still moist. (Pl. 18, *e*.)

There was another class of objects which bore the same type of decoration. (Pl. 18, *f*.) They were quite like the cloud blowers in their general form but had no lengthwise perforation through the stem. The larger end was cupped, resembling somewhat the bowl portion of the other objects. This "bowl" showed no traces of fire, however, and the objects certainly could never have been used for the same purpose as the cloud blowers. Mr. Morris reports similar objects, but made from unfired clay, which he found in the Canyon del Muerto in northeastern Arizona, and one unfired specimen from the Mimbres Valley in southern New Mexico. He sums up the question of these objects as follows:

> No definite function can be assigned to these nipple-shaped objects. It is plain enough, however, that they had no utilitarian value. Notwithstanding that they are purely speculative, a few suggestions may be worth presenting. The conclusion seems unavoidable that the female figurines described in a previous section were cult objects. The nose and breasts are in high relief, being, in fact, the most conspicuous portions of the figures. Presumably when cult personages

appeared in ceremonial regalia or were represented in altar fittings, these same anatomical features would have been stressed. The four specimens of the present series, which were unquestionably completed, seem to represent the type, and are perforated in a manner that would permit them to be attached to a vertical surface so that they would rest with their longitudinal axes in a horizontal plane. Thus, lashed to masks, they would have served very well to depict noses, or sewn to clothing, mammary glands. Again, when held tip downward, they are suggestive in shape of the large carrying baskets in use at the time of their manufacture. To represent these they may have been placed on the backs of manikins, perhaps attached directly to the substances of which the latter were made, by means of the perforations which are in a comparable position to the loops on the baskets themselves, or fastened to the ends of miniature tump lines passing across the foreheads of the figures.[81]

The writer is inclined to believe that the last suggestion of Morris has a closer bearing on the problem than the preceding ones. In the next period, Pueblo I, and those following, objects which are very similar in shape and outline were made. The latter show quite distinctly that they were patterned after the baskets referred to in the above quotation. In view of this fact it may well be that the cruder objects here considered were the prototype for the later forms. This must be considered, however, as Mr. Morris points out, in the light of pure speculation. Our present evidence is not sufficient for the drawing of any definite conclusions.

Bonework

Bone implements from an archeological excavation are interesting not only for a study of the various types of tools made from this material and their probable function but also for the record which they furnish of the fauna present in the region at the time the site was occupied. The implements from the Chaco village were not extremely numerous, but even in the small series available for study a number of different animals and birds are represented. It is certain that the mule deer (*Odocoileus hemionus*), the prong horn antelope (*Antilocarpa americana*), the wildcat (*Lynx rufus*), and jackrabbit (*Lepus californicus texianus*) were in the neighborhood, because there are implements made from bones of these animals in the collection. The process of tool making is such, however, that in many cases the distinguishing features of the bone are removed and it is impossible to identify the animal or bird represented. This is especially true of the latter bones from the Chaco site. It is possible to identify them as such, but further than that no definite statements can be made. It is quite possible that they are from turkeys, as the bones are large enough to have come from such a fowl, and it is known that there were wild turkeys in the region. The elk (*Cervus*

[81] Morris, Beginnings of Pottery Making, p. 158.

canadensis occidentalis) is represented by one flaking tool which was made from one of the prongs of an antler.[82]

It is readily apparent that bone furnishes an ideal material from which to make certain kinds of implements. The ease with which it may be fashioned and the slight amount of labor involved in shaping many tools from it are attributes of no little value. Added to this is the factor of a fairly constant supply of the raw material resulting as a by-product from the ever-important industry of the satisfaction of hunger. Many times it was necessary only to sharpen the end of a broken bone to make a serviceable punch or awl. The condyle or articular end was left intact and from its nature furnished an excellent handle for the implement. At other times the split bones and fortuitous splinters remaining after a feast were taken and given a sharp point. No other work was necessary to make them usable. In other instances the maker was more particular and carefully smoothed and polished the entire implement.

Bone splinters seem to have been the commonest source of material as far as the boneworkers of the Chaco village were concerned. A majority of their implements were made from such fragments. However, complete bones and specially cut pieces were by no means neglected. A general classification which might be made would group the implements into two divisions, one consisting of the simple pointed splinters, the other comprising tools which had been carefully worked and polished in addition to being shaped at the ends.

AWLS

Typical specimens of awls which belong in the sharpened-splinter group are illustrated in the upper row of Plate 19. The majority of them are fragments of long bones. Some indicate a partial polish which is the result of use but they do not show the definite and intentional smoothing which is apparent on those of the middle and lowest rows of the same photograph. Some of the latter were made from rib fragments as well as from fortuitous splinters from long bones.

The long bones from the deer, antelope, and smaller mammals seem to have been favored especially for the making of awls. (Pl. 20.) The common practice, apparently, was to split the longer bones, sharpen one end to a good point, leaving the condyles at the other, and then to polish the entire implement. Constant resharpening of the point would, in the course of time, so wear down the bone that practically nothing but the articular surface which formed the handle

[82] The writer wishes to express his appreciation for the assistance given him in the identification of these bones by Dr. A. Wetmore and Mr. H. H. Shamel, of the U. S. National Museum.

would be left. Several examples of this are to be seen in Plate 20, *b*, *c*, *d*, *h*. The cannon bone of the mule deer was especially adapted for this type of implement because there is a natural groove down the center of the anterior surface which, with the division of the articular surfaces at the end, gave a natural line of cleavage, so to speak, along which the cut was made. Four of the implements pictured show this very clearly. All but two of the bones in this group are from the mule deer and antelope. The implement lettered *g* was made from the tibia of a jack rabbit while *f* is from the ulna of a wildcat. The latter bone was only slightly modified in the process of making the desired implement.

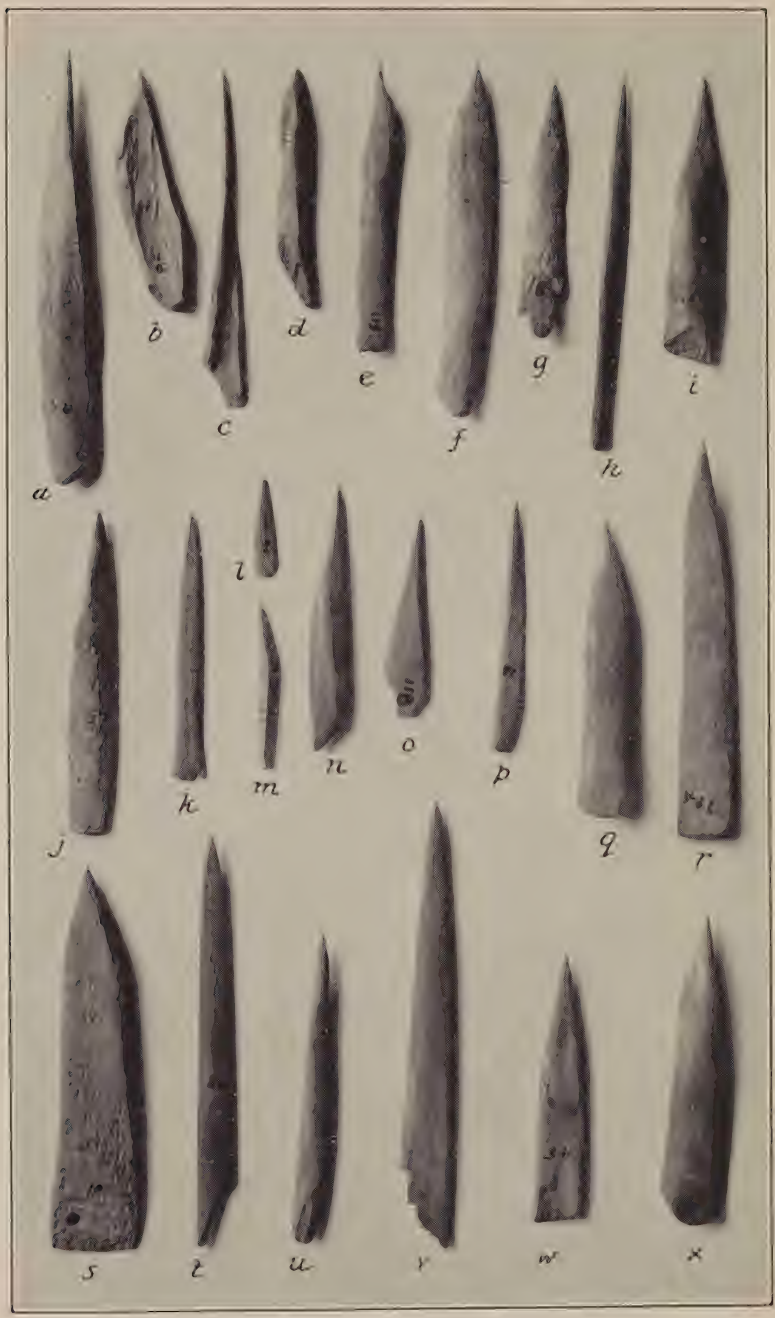
Other examples of awls which were made with but little modification of the original bone are illustrated in Plate 21. As a matter of fact all that was done was to rub one end down to a sharp point and give the bone some additional polishing. Even this was not always done. The commonest sources of material for tools of this type appear to have been the radii, tibiae, and ulnae of jack rabbits (*a*, *b*, *c*, *d*, *e*) and the fibulæ and radii of wildcats (*f*, *g*).

SPATULATE AWLS

There is still another class of bone tools which have the characteristic sharp points of the awls but another feature in addition. These implements are the so-called spatulate awls. (Pl. 22, upper row.) One end has the customary sharp point of the awl while the other is squared or rounded and has been smoothed down until the edge is quite thin. Frequently an additional feature of this edge is its beveling. The increased usefulness of such an awl over the simple type is quite apparent. With such a tool it would be possible to employ one end for smoothing, rubbing, or scraping and the other for making perforations. The spatulate awls of the upper row, Plate 22, are fairly simple in form. The one at the left end of the lower row, *e*, suggests a little better workmanship in its manufacture. The point is not as sharp as in the other specimens but the spatulate feature was better before the object was broken. The bone is fairly thin and had a very good edge for smoothing and rubbing purposes. It also might have served as a shuttle in weaving.

The second implement from the left in the lower row, Plate 22, *f*, is of the spatulate form at one end but was not pointed at the other. The latter was slightly rounded instead. This implement more closely approaches what is generally considered the true spatulate type. It was the only specimen of its kind found in the village. While it is not common in the collections from any of the southwestern ruins this form of implement is found more frequently at sites belonging to later periods.

CLOUD BLOWERS AND ADDITIONAL CLAY OBJECT

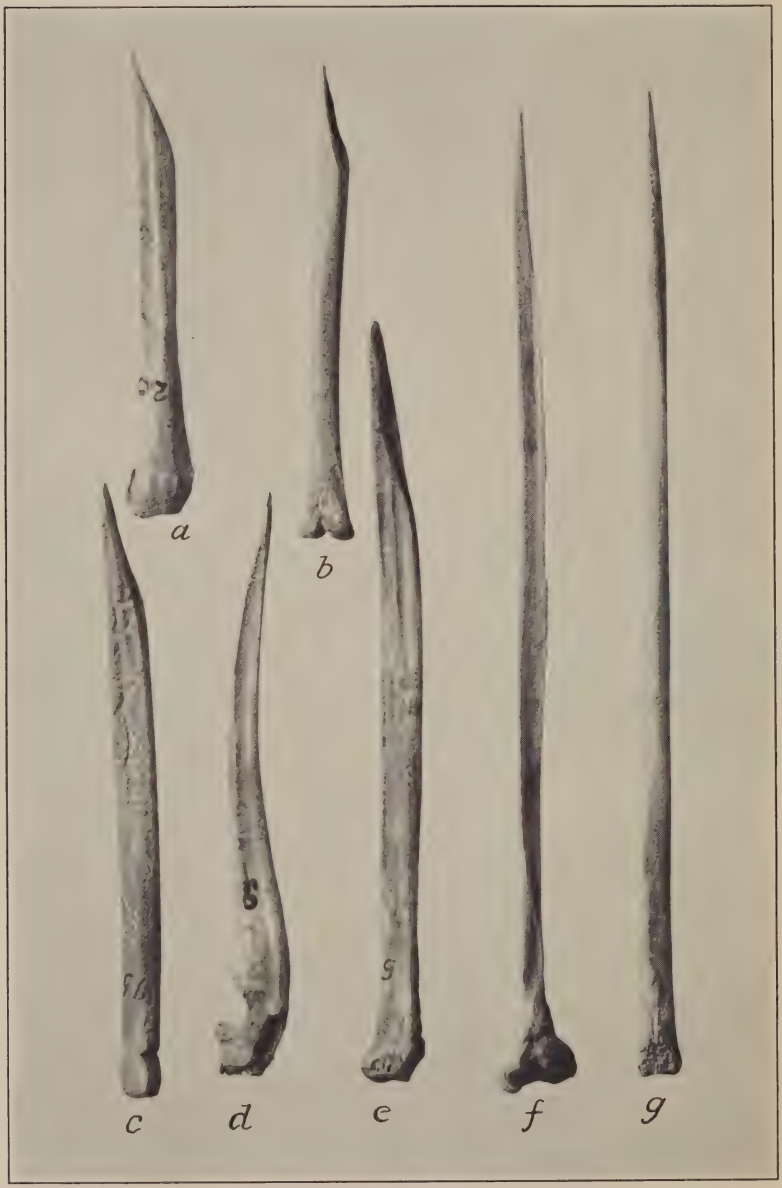


BONE IMPLEMENTS, AWLS

a measures 4⅞ inches (12.38 cm.) in length

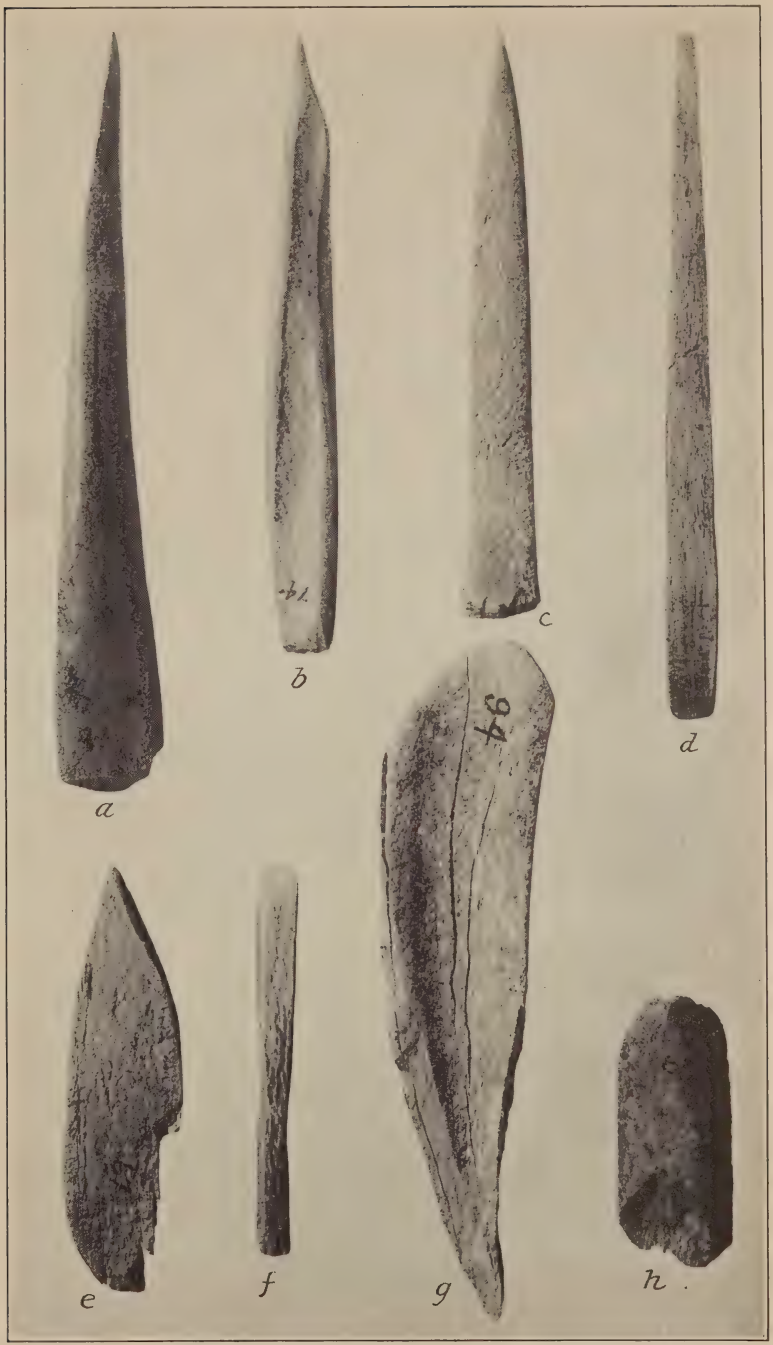
BONE IMPLEMENTS, AWLS

a measures 7 13/16 inches (19.72 cm.) in length



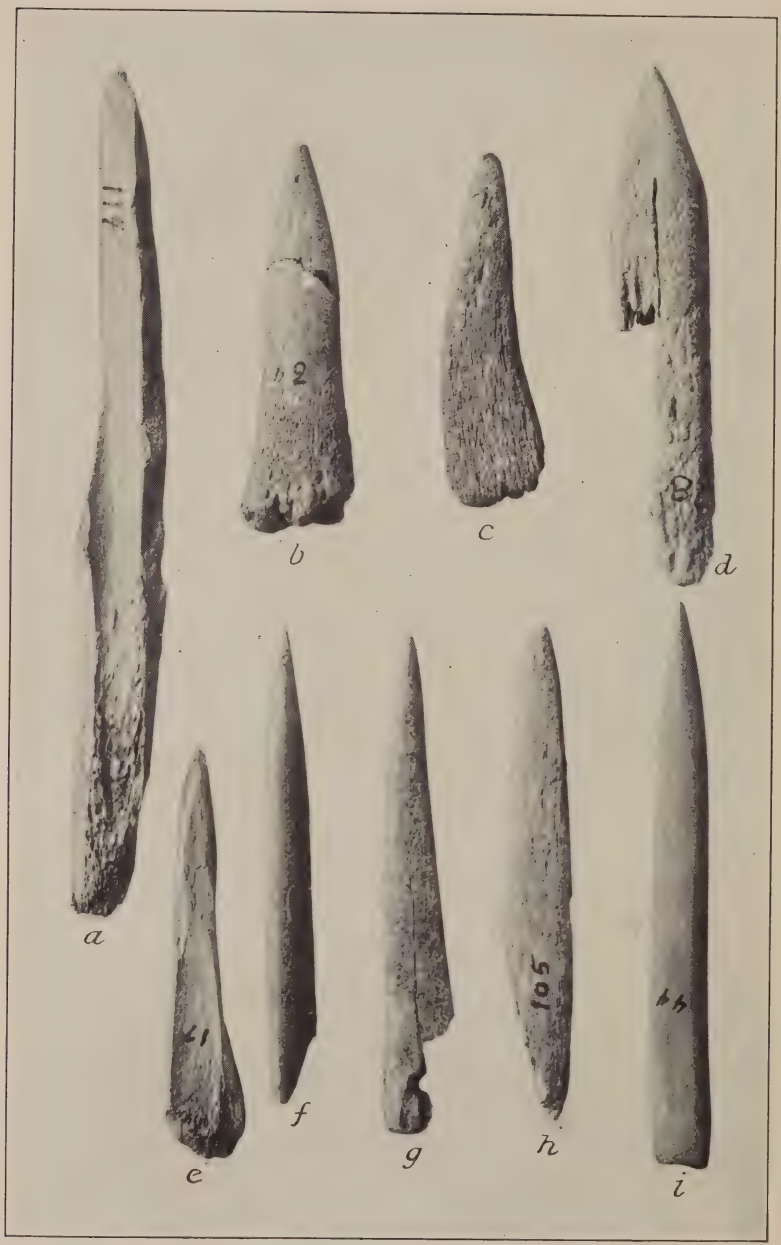
BONE IMPLEMENTS, AWLS

g measures 5 7/16 inches (13.9 cm.) in length



BONE IMPLEMENTS, SPATULATE AWLS

a measures 5⅜ inches (13.7 cm.) in length

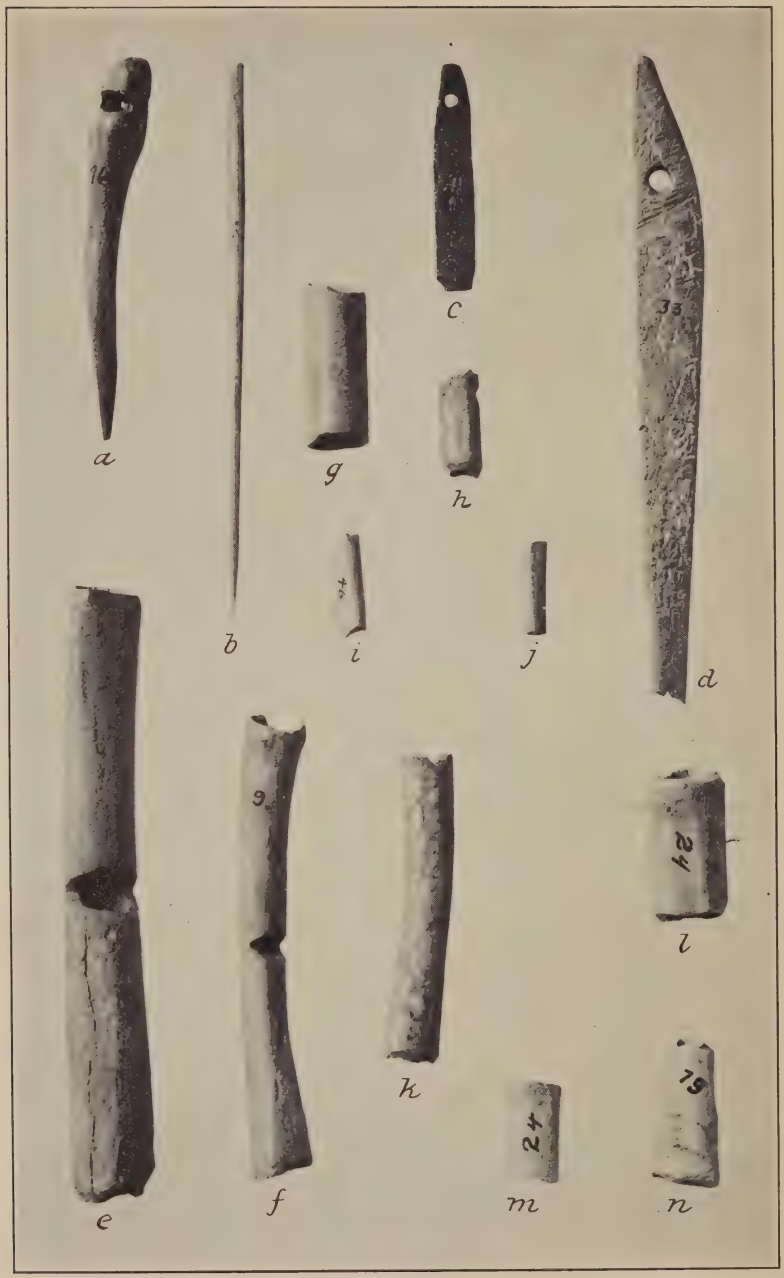


BONE IMPLEMENTS, PUNCHES

a measures 5½ inches (13.97 cm.) in length

BONE IMPLEMENTS

a, Spoon spatula, 10 inches (25.4 cm.) in length. *b*, Scraper or dressing tool. *c*, Flaker



BONE IMPLEMENTS, NEEDLES, BODKINS, WHISTLES, AND BEADS

Long whistle measures 4 inches (10.16 cm.) in length

The third implement in the lower row, Plate 22, *g*, is what might be termed a knifelike spatula. It was made from a large splinter from the shaft of a long bone of a large mammal, probably a deer. One side and end was worked down to a slight curve and a fairly thin edge. Such a tool, in spite of its lack of finish in all other respects, would be very serviceable in the skinning of animals.

The last implement in the lower row of this same plate, *h*, is difficult to classify. A fragment from a long bone was taken, its ends rounded off and one edge beveled to make a fairly sharp blade. The opposite edge was rubbed down to a comparatively blunt surface and the sides were well polished. The most appropriate name for such an implement, if it may be permissible to borrow from the nomenclature of stone tools, is side scraper. A small bone side scraper of this nature would find many uses.

PUNCHES

Differing from the awls only in the degree of the sharpness of the pointed ends is the group of so-called punches. The latter, like the awls, were made from fortuitous splinters, from especially cut long bones, and occasionally from antler prongs. They were polished or not according to the whim of the maker. (Pl. 23.) As will be noted from the illustration, the points on these implements are considerably blunter and more rounded than those of the awls.

The implement made from an antler tip (pl. 23, *c*) is of additional interest because of the fact that it had been hollowed out at the base end and the edges smoothed down. This suggests that it might possibly have been a handle for a knife rather than a punch as its tip end would indicate. The only objection to the former is that it is almost too small to have held a knife blade of any great usefulness. It is one of those forms which do not readily fall into any classification.

FLAKING TOOLS

There is another form of tool which frequently is classed with the punches but which, strictly speaking, is a different implement. These are the flakers. They were made generally from antlers and were finished with a fairly rounded point, one which could hardly be used for penetrating purposes. (Pl. 24, *c*.) Their function was essentially different in that they were used in the fashioning of stone implements. In the flaking of spear points and arrowheads the later Indians used this type of implement. To give a stone flake its desired shape small fragments were removed by sudden pressure exerted through the blunt points of the flaking tools. The pictured

specimen was the only good one secured. Pieces from others of the same type and material were uncovered, but they were too fragmentary to serve for illustrative purposes.

SCRAPER OR DRESSING TOOL

An unusual form of scraper or dressing tool was found. (Pl. 24, *b*.) It appears to have been made from a scapula or shoulder blade, possibly that of a deer, but the distinguishing features were so obliterated in its manufacture that it is impossible definitely to identify it. All of the edges were carefully smoothed down, but the convex one shows a high degree of polish which could have come only through long use. The small, slightly concave section at one end of the generally convex edge shows an additional feature in that one side is sharply beveled, giving it an almost knifelike character. Just what the function of this implement may have been is not known. There is no doubt but that it had several uses, as did all of the tools, but it would seem that it was preeminently adapted for use in the dressing and tanning of skins.

SPOONLIKE SPATULA

The first implement illustrated in Plate 24, *a*, is also of a rather unusual character. It was made from one of the long bones of a large mammal, quite likely a deer, but the work on it had been done so carefully that no distinguishing marks are left. The bone was split down the center, the interior carefully scraped, the spoon or paddlelike end given the desired shape, and the whole implement carefully polished. Such an object certainly was adapted to a multiplicity of uses. It could well serve in the nature of a spoon. The beveled edge at the end of the paddle portion would function nicely as a spatula or as a scraper. One corner of this section of the implement is slightly rounded and shows a high degree of polish which is clearly indicative of use. An almost identical specimen was found accompanying a burial discovered while excavating on the knoll across from the main village the preceding summer.

NEEDLES AND BODKINS

Another group of implements which might be considered as a variation of the awl type but which are far superior in functional possibilities comprises the needles and bodkins. (Pl. 25, *a*, *b*, *c*, *d*.) Implements of this form are comparatively rare and unfortunately not one complete specimen was secured during the excavations. A perfect needle with characteristic "eye" was found in the remains of the structure, referred to in a preceding paragraph, called Arroyo

House, located on the floor of the canyon just below the village, and a complete bodkin was recovered during the excavation of the protokiva house, but fragmentary specimens were all that came to light during the 1927 work.

The inclusion of the first implement (pl. 25, *a*) in this group might be questioned. The large head would be a decided hindrance in any sewing operations but the tool would be very good for making baskets. It might be considered as one form of bodkin, although it is quite possible that the perforation was for purposes of suspension only. Hung by a cord about the neck of the owner, it would not be lost as easily as the ordinary type of awl or punch and would be ready to hand on all occasions.

The second implement (pl. 25, *b*) shows clearly that it was at one time perforated at the blunt end. During its use, however, the portion weakened by the "eye" broke off. The tool was not discarded, though, and the broken end was smoothed down, the implement then serving as a very fine awl. The smoothing process did not obliterate completely the "eye," traces of which are still quite apparent.

The next two specimens pictured (pl. 25, *c*, *d*) are fragments from the bodkin type of implement. They were made from broad, flat bones, probably ribs. The "eye" feature is quite apparent but unfortunately the points are missing and could not be found in the digging. Such tools would be of value in weaving and the making of baskets but certainly would not be as serviceable in true sewing as the characteristic needle form previously described. It is of interest to note that even in the early stages of southwestern development the people appreciated the advantages of an implement with an "eye" in it.

WHISTLES AND BEADS

The last type of bonework to be considered is that of the objects made from the shaft portions of the long bones of small mammals and birds. These are the bone tubes, including the whistles and beads. Their manufacture was quite a simple process. All that was necessary was to cut off the ends of the bones and then to polish the objects. When a whistle was desired it was necessary to do some additional work and to make a vent or stop in the side.

Plate 25, *e*, *f*, are two examples of the whistles or, as they sometimes are designated, birdcalls made from such bones. The flute type, tubes with a series of vents, does not seem to have been made here during this period. Many fragments from the single-holed whistles were found, but no evidence of the flute form was found. As in so many of the preceding examples, it is impossible to tell

what animal is represented. It is certain that the whistles were made from mammal bones, but beyond that fact nothing more can be said.

A different form of whistle is represented by a small tube with two notches cut on opposite sides at one of the ends. (Pl. 25, *g*.) Just how this was used is not clear, but two Zuñi workmen, Charlie Pinto and Bill Poncho, were insistent that it was a whistle. They stated that a small cord was placed across the opening in the notches and that the breath was blown across it, thus making the desired sound. They illustrated the method and obtained a sharp, hisslike note. It is possible that this type of whistle is the prototype of, or bears some relation to, the so-called Bitsitsi whistles used in one of the Shalako ceremonies at the present pueblo of Zuñi. Mr. Hodge found bone forms of this present-day "vegetable-matter" whistle at the old Zuñi ruin of Hawikuh.[83] The main point of difference, however, is that the bone examples from Hawikuh were in two pieces, fitted together and tied, while the specimen from the Chaco village is a complete tube. This may be a sufficient difference to invalidate such a comparison, but nevertheless both have the small notches at one end.

The remaining examples of bonework belong to the so-called bead group. The latter includes all short bone tubes, cut and polished, which might have served for such a purpose. Plate 25, *k*, was made from the humerus of an unidentifiable bird. The two specimens, *h* and *i*, were not completed. Traces of the grooves made in cutting them are still apparent. The polishing and finishing process had not been resorted to. While rather indefinite in character these fragments are quite suggestive of rabbit bones. A finished specimen is shown in *j*. The last three specimens, *l*, *m*, and *n*, were probably beads. It is impossible to tell from what animal or bird they were taken.

Objects of Stone

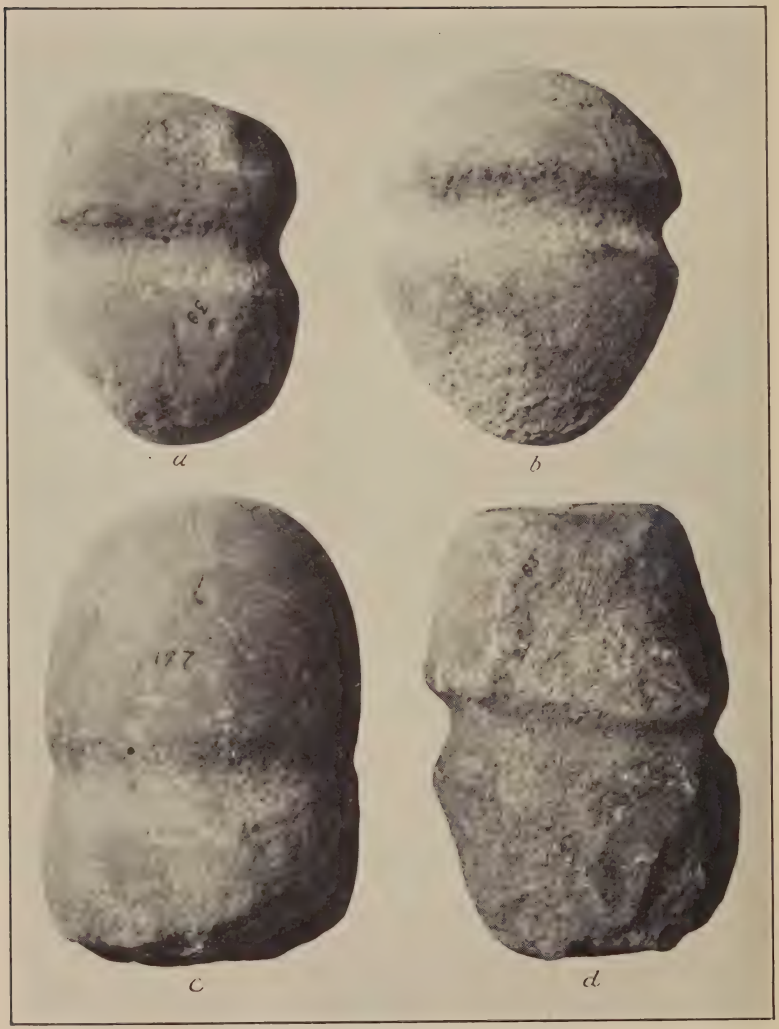
There were not many objects fashioned from stone in the material which came to light during the progress of the excavations, but there are a number of different tools and implements represented in the collection. Stone material seems to have been used chiefly for metates or milling stones, manos, mauls, knife blades, spear and arrow points, although some odd objects fashioned out of it were obtained.

METATES

The metates or milling stones were all of the same general type and quite characteristic in form. (Pl. 26.) They were made from comparatively thin slabs of sandstone, and except for the groove or

[83] Hodge, Hawikuh Bonework, p. 130.

STONE OBJECTS, METATES



STONE IMPLEMENTS, MAULS

trough pecked down the center of one side were unmodified. Because of the thinness of the rock from which they were made, it was not possible to work out a very deep groove. The life of a single metate would not be very long, either, because the trough could only be pecked and roughened a few times before the bottom would become too thin for use. In many cases a small hole was worn completely through the bottom of the groove. The rapidity with which this type of metate would wear out probably accounts for the large number of them found among the slabs used to line the excavated portions of the houses.

There is a very common and widespread misconception with respect to the grooves in metates. Contrary to general opinion they were not made by use alone but were due in part to an intentional pecking out of the rock. After a period of use the stone would become so smooth that it would not grind corn as efficiently as might be desired and it would be necessary to roughen the surface to some extent. This was done by pecking the bottom and sides of the groove with a small sharp-cornered stone. Many of the latter are found in the houses, generally in close proximity to the metates. Under such conditions it would not take a great length of time to wear a comparatively deep groove. At the present time women of the Pueblos in the Southwest may be seen dressing down their metates in the manner just described. In spite of this fact, however, the idea that a deep groove in a metate shows a tremendously long period of use still persists. Papers, even, have been written by misguided amateurs showing, or rather attempting to show, the many years which would be required in producing such a trough. For this reason it has been thought advisable to call attention to the facts in the case.

The three metates illustrated were found in position in the houses. They are typical of the whole group found in the village. The manos, or hand stones, which were used in the grooves were found in position when they were uncovered. Their general features are clearly shown in the photograph. They were not of a highly specialized form purposely made for that definite function, but were as a rule stones of convenient size and shape which could be used with practically no alteration. In fact the only change apparent is that which may be attributed to use.

Similar metates have been found at other sites of the Late Basket Maker period. Morris reports the same type from La Plata Valley in southwestern Colorado.[84]

The writer found the same form along the upper reaches of the San Juan and along the Piedra, one of its northern tributaries, in

[84] Morris, Antiquities of Southwestern Colorado, p. 200, fig. 6.

the same State. An apparently similar specimen is reported from a true Basket Maker site in northeastern Arizona.[85] It would seem fairly safe to conclude that the Chaco village metates were of the form which may be considered as characteristic of the Basket Maker peoples of Periods II and III.

In order that some idea as to the size of these objects may be obtained the following measurements of the specimens shown in Plate 26 are given: *a*, 2 feet (60.96 cm.) at its greatest length; 1 foot 6 inches (45.72 cm.) wide; 3 inches (7.62 cm.) thick; the groove measured 1 foot 4 inches (40.64 cm.) in length, 8 inches (20.32 cm.) in width, and 2 inches (5.08 cm.) in depth. *b*, 2 feet 1 inch (63.5 cm.) long; 1 foot 5½ inches (44.45 cm.) wide; 4 inches (10.16 cm.) thick; the groove was 1 foot 3½ inches (39.37 cm.) long, 9 inches (22.86 cm.) wide, and 2 inches (5.08 cm.) deep. *c*, 1 foot 8½ inches (52.07 cm.) long; 1 foot 2½ inches (36.83 cm.) wide; 5 inches (12.7 cm.) thick; the groove measured 1 foot 2½ inches (36.83 cm.) long, 9 inches (22.86 cm.) wide and 1½ inches (3.81 cm.) in depth.

MAULS OR HAMMERS

No stone ax heads were found in the material from the houses and dump heaps, but the one-time occupants of the village seem to have made considerable use of grooved mauls or hammers. A number of good specimens of this type of stone implement were found and there were many fragments from similar tools in the débris. All indications point to two general types of mauls. One tended to the cylindrical form while the other was flat. Both forms had a groove around the center for the purpose of hafting the head to its handle. The shape was no doubt due, in part at least, to the material available for the makers. Rounded bowlders from the bed of a watercourse would be excellent for making the cylindrical forms, while any small block of stone would serve for the flat type.

These hammers, and others like them, were no doubt used for quarrying the large slabs which were used to line the pit or excavated portions of the storage bins and dwellings, for metate stones and other material needed in the day-to-day life of the people. These mauls may have served on occasions for driving pegs and posts into the earth and even, possibly, for killing. The smaller forms are frequently referred to as club heads. None of the Chaco village mauls was as small, however, as those generally included in the latter group. All of the specimens found were made from a fairly hard sandstone. The material is soft enough to be easily worked and the heads were shaped, where the stone was at all altered, by the pecking and rubbing process.

[85] Guernsey and Kidder, Basket-Maker Caves, p. 93.

Two characteristic examples of the flattened type of hammer or maul are illustrated in Plate 27, *a* and *d*. Some effort was made to shape *d*, but there was apparently no intentional alteration or modification of *a* except the central groove. The former was pecked along the edges with the evident intent of tapering the stone toward the ends. They may have been quite pointed originally, but through use have become decidedly blunt. One side of the implement is very flat and smooth, presumably the result of considerable rubbing, while the other is rather rough and uneven. This feature suggests that perhaps the implement was made from a discarded mano or hand stone used in the grinding of corn. The grooves around the centers of both of these implements are well made. They are deeper at the edges, the top, and bottom of the implement than at the sides.

Maul *a* (pl. 27) is the smallest of the group. It has an over-all length of 5 inches (12.7 cm.), a breadth of 3½ inches (8.9 cm.), and a thickness of 2¼ inches (5.71 cm.). Maul *d* measures 6⅛ inches (15.55 cm.) in length, 4⅛ inches (10.5 cm.) broad, and 2⅛ inches (5.4 cm.) thick.

One of the examples pictured (pl. 27, *b*) shows very few signs of use. There is practically no battering on the ends. It is well shaped with one conical end and the other quite rounded. It is a good example of one form of the cylindrical type. The total length of this specimen is $5\frac{3}{16}$ inches (13.15 cm.), its breadth is $4\frac{3}{16}$ inches (10.61 cm.), and its thickness 3½ inches (8.9 cm.).

The second example of the cylindrical type (pl. 27, *c*) appears originally to have been of the doubly conical form, but one end has been so battered and broken through use that the shape is somewhat altered. It is a larger implement than the one described above and great care seems to have been taken in its manufacture. The surface, where not roughened by use, indicates careful rubbing and there can be little question but that when the tool was first made it was a well-smoothed object. Its present size is: length 6½ inches (16.51 cm.); breadth, $4\frac{3}{16}$ inches (10.61 cm.); thickness, $3\frac{3}{16}$ inches (8.07 cm.).

The absence of the ax-head type of stone implement seems to be rather characteristic of the earlier phases of the sedentary cultures in the Southwest. Mauls of the types described seem to occur quite regularly but the edged tools are comparatively rare. Morris reported finding fragments and also a number of complete ax heads in his La Plata work, but from the information available at the present writing this seems to be a rather isolated case. The axes appear to have come from a structure which was unquestionably more closely related to the Pueblo I period than it was to the characteristic phase of Basket Maker III. The house type and other objects found indicate

that the site was approximately on the border line separating the two stages.[86]

At 17 Late Basket Maker sites in the region lying between the Piedra and upper San Juan Rivers, some distance east of the La Plata district, the writer found many cylindrical and flat mauls but no axes. Guernsey and Kidder report neither from their true Basket Maker investigations,[87] although three axes are figured in their earlier paper dealing with the Basket Maker and Pueblo cultures. These specimens were definitely shown, however, to have belonged to the later rather than the earlier phase.[88] Mr. N. M. Judd found but two of the grooved axes during six seasons of investigations in the region north of the Colorado River in southeastern and southern Utah. These two specimens were found in a canyon in which some of the old houses were located but which also includes in its ruins the remains of dwellings of the Pueblo periods. The axes seem to have belonged to the latter rather than to the former cultural level.[89]

Future work may bring more specimens to light, but in the present state of our knowledge it would appear that the ax was a little-used implement even in the Basket Maker III period. Under such circumstances it is quite probable that the timbers necessary in the construction of the houses were felled and the required lengths obtained by means of fire. The butt ends of some of the timbers which were still in place in some of the ruins excavated suggested that such a method had been used.

CHIPPED IMPLEMENTS

The group of chipped implements includes scrapers, knife blades, spearheads, and arrowheads. The materials from which these objects were made vary somewhat but there is not a great number of different kinds of stone represented. There is considerable variation in the quality of workmanship exhibited by the different specimens. This is in some measure attributable to the purpose for which the object was intended and in no small degree to the material itself. One form of stone chips differently from another. Some kinds are capable of taking a fine edge and of being worked to very thin blades while others will produce but a thick, coarse, rough-edge tool at best. Then, too, the human equation with its differing degrees of ability must always be borne in mind. Even in the most primitive groups certain individuals are more skilled in some lines of work than their fellows.

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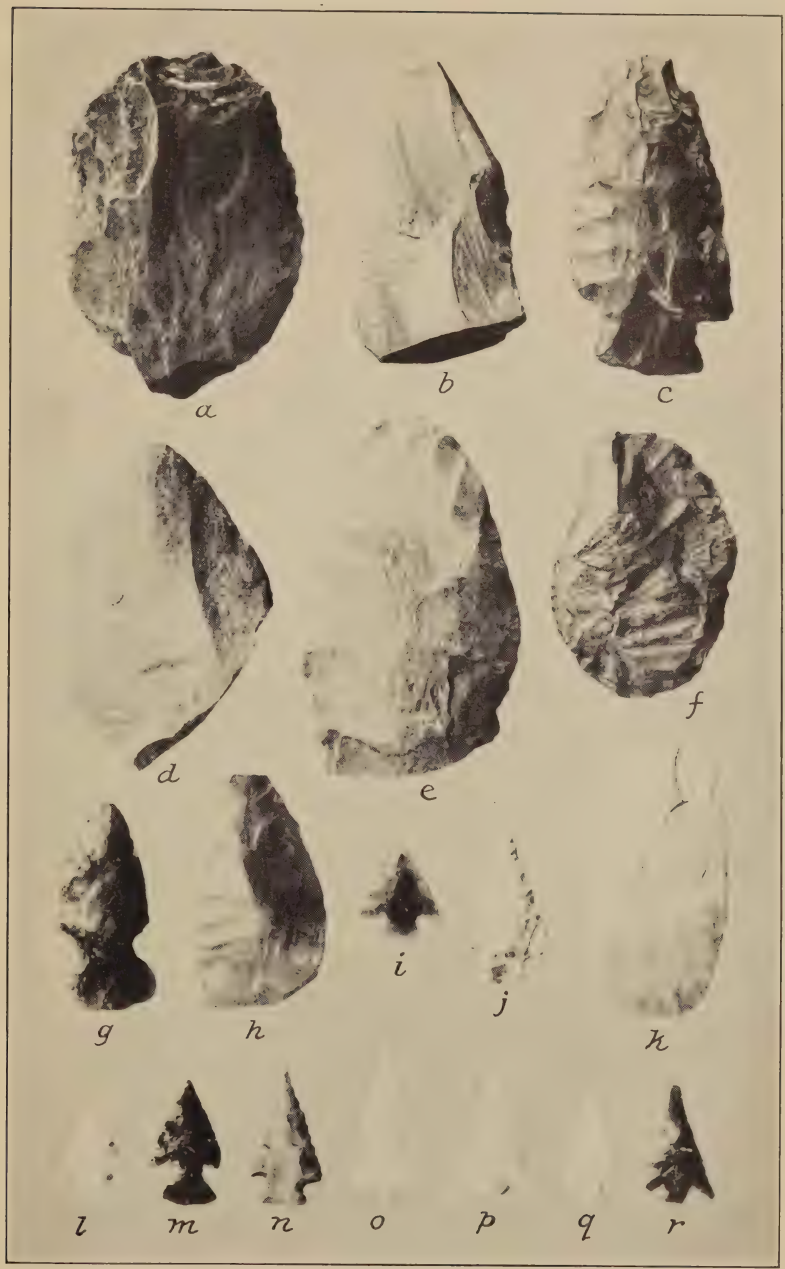
[86] Morris, Antiquities of Southwestern Colorado, p. 201.
[87] Guernsey and Kidder, Basket-Maker Caves.
[88] Kidder and Guernsey, Archeological Explorations, p. 125, pl. 52, i, j, k.
[89] Judd, Archeological Observations, p. 146, pl. 50, d, h.



CHIPPED STONE IMPLEMENTS

a measures 2½ inches by 1⅝ inches (6.35 cm. by 4.13 cm.)

MISCELLANEOUS STONE OBJECTS

g measures 3¼ inches (8.3 cm.) in length

The scrapers (pl. 28, *a*, *b*, *d*, *f*) are all rather crude in form but are sufficiently finished to serve their intended function admirably. A more perfectly shaped implement would do the work no better than these rough forms. Although they are of a nature which, in the minds of many, might relegate them to the all-inclusive and nondescript class termed "rejects," they should not be so considered. All were found in houses in association with other objects of daily use and all show signs of wear. The chipping around the edges is carefully done. The primary beveling of the edge by the removal of large flakes was improved upon by a secondary, more minute chipping which greatly sharpened the cutting or scraping portions of the implements.

Plate 28, *a*, shows a flake of indurated shale which was struck off from a larger block of the material, as is shown by the bulb of percussion at one end. The stone was carefully chipped all around its edges and would be of considerable service in a variety of uses. It could be used for severing bone, for cutting and scraping purposes in the preparation of skins, for scraping poles, and even for shaping wooden objects.

The second implement (pl. 28, *b*) is of the same material as the first. It is of an entirely different shape, however, and was chipped along one edge only. The stone is an elongated triangle in cross section, the apex forming the cutting edge. The latter received a secondary sharpening through the medium of the flaking tool. The implement would have done good service in the capacity of an unmounted knife blade or a side scraper. It apparently was quite pointed originally, but was broken off, presumably during use. This did not lead to its immediate discardment, as the broken end shows signs of rubbing which could have resulted only from continued use.

A good side scraper was made from a chip off a quartzite bowlder. (Pl. 28, *d*.) This implement was chipped along its convex edge only. The opposite edge has been worn and smoothed considerably and has the peculiar polish which comes only through use. This tool could have served a variety of uses.

One of the finest scrapers of the group (pl. 28, *f*) was made from a chert flake. The object is considerably thinner than the ones just described and, except for a small section of the periphery at the bulb of percussion where it was struck off a larger bowlder, was chipped all around the edge. This chipping is too finely and carefully done, as was true in the case of the other scrapers, to consider the object other than a specific tool, although generalized as far as use was concerned. As it is at the present time it would make a serviceable implement.

A group of flaked implements which shows more careful shaping and which represents a more specialized form is that of the knife blades. The largest of these (pl. 28, *e*) is a well-shaped blade of chert. The edges are not as finely chipped as in some of the other specimens, a fact no doubt due to the material itself, but nevertheless it would have made a very useful implement when mounted in a wooden or antler handle. The second one illustrated (pl. 28, *k*) was originally an excellent specimen, but through use or accident the point had been broken off. The blade was made from a thin chip of chalcedony. The cutting edges show unusually careful flaking and the surfaces were well worked down by the removal of large cross flakes. The point was broken off of the third specimen also. (Pl. 28, *h*.) This blade was not as finely shaped as the preceding one but no doubt was just as effective in use. The cutting edges show careful chipping but one side has a rather pronounced convex ridge along the center of the blade. The grain of the material is such that this projection could not have been removed without breaking the tool.

Two types of material seem to have been popular for the making of projectile points. This was no doubt due to the fact that both are easily and readily chipped. One group of points was made from obsidian flakes, the other from chalcedony. Implements of the latter group were found in slightly greater numbers, although there does not seem to have been an especially marked preference for either. Caches of the raw material were discovered at several points in the village and there was about an equal amount of the two kinds of stone in each.

The chief distinction between spear points and arrowheads is based largely on their size. The larger specimens are considered under the former heading and the smaller are placed in the latter group. Although there were fragments from many broken spearheads only two practically complete examples were found. The largest (pl. 28, *c*) is longer than some of the knife blades, and while it might be considered by some as belonging with the latter group there are certain features about it which show that it should be considered as a spearhead. Notched knife blades with tangs for mounting are occasionally found, but experience has shown that in the earlier cultures, at least, the notches of this group are set at an acute angle to the long axis of the blade. Spear points, on the other hand, have the notches set at right angles to the long line of the implement.[90] This spearhead was made from a large flake of chalcedony and shows careful workmanship. The blade is thin, the bevel is not

[90] Guernsey and Kidder, Basket-Maker Caves, p. 87, pl. 35.

pronounced, and the edges are comparatively sharp. The shoulders, at the notches, are square to rounded in form.

The second specimen of a spearhead might be considered either under this classification or as a large arrowhead. (Pl. 28, *g*.) It was made from obsidian, and although the edges are well chipped the blade is quite thick. . The tang is rather large but, as was noted in the example described above, the notches are at right angles to the long axis of the blade.

As will be observed from the points illustrated, the characteristic and predominant form of arrowhead was one with long, sharp barbs. The notches are set at an acute angle to the long axis of the blade and are quite deep. The neck of the tang, because of the style of notch, is narrower than its base, so much so in many cases that the tang appears to have been set into the base of the arrowhead. The square or rounded shoulder forms with the notch at right angles (pl. 28, *j*, *n*, *q*) are decidedly rare. They became the predominant type, however, in later periods in this region.

The edges of all the points are well chipped, the blade is flat and they no doubt had good qualities of penetration. All of the points are small and must have been intended primarily for small game, although a number of those pictured would have been large enough to inflict a severe wound on a human being.

All of the points illustrated were found in the houses or at the bottoms of the refuse mounds. None came from the surface. A great many specimens were picked up from the surface, but they are not included in this study because they can not be considered as definitely representing any period. A curious and perhaps significant fact is that the great majority of the latter show the square shoulder and straight tang instead of the form noted for those from the excavations. It seems rather certain that at the time Shabik'eshchee village was occupied the bow and arrow had gained a foothold and were definitely replacing the short spear and atlatl, the chief weapons thus far known from the Basket Maker II period. Until quite recently it was thought that the bow and arrow were unknown in Basket Maker III times because in some of the earlier sites belonging to this cultural stage there were no indications of the weapon.

OTHER OBJECTS OF STONE

There are several additional objects made from stone which do not fall into any general classification. In some instances no definite purpose or function may be ascribed to them and in other cases any use suggested would be largely conjectural. Consequently they must be considered as being for the most part indeterminate.

Plate 29, *a*, is a block of calcite, which shows considerable smoothing and shaping. There is a cone-shaped cavity in one end which was carefully made. The depth of the latter is approximately half of the total length of the stone. The bottom of the cavity is quite pointed and the sides show no signs of rubbing, so that it could not have been used as a holder for a revolving implement, such as a fire stick or drill. Its function is not known.

Two objects which may have been fetishes, stones believed to have some magic properties, were found in two of the houses. One of them is a piece of selenite, which might be considered as an elongated form of the conventional heart shape. (Pl. 29, *b*.) This stone shows no rubbing or smoothing, except what little natural shaping it may have received along its edges. It is practically transparent, but when held in certain lights it is filled with colors which have a rainbowlike quality which must have attracted an Indian and would no doubt suggest to his mind certain attributes of significance. The second is an egg-shaped quartz crystal. (Pl. 29, *c*.) Its form is natural, but several places on the surface indicate that slight projections or rough spots have been broken off, perhaps accidentally or possibly with some intent to improve the original shape.

One of the objects (pl. 29, *d*) was made from a piece of pink-and-white indurated talc. From its general shape and character this stone might well have been used in the smoothing of pottery. The sides and ends show polish as from use. Such an implement would have been serviceable in obliterating the bands of clay from which a pot was built up and in shaping the interior walls of the vessel. The stone shows quite clearly where it was cut and broken off from a larger piece of material. The cut was not made completely through the stone but about one-third of the way on one side and approximately one-fourth of the distance on the other. This was sufficient, however, to make it possible to break it off along a fairly straight line. The rough spots remaining were then rubbed down.

One of the indeterminate objects is a block of jasper which has one smooth side and one end partially rounded. (Pl. 29, *e*.) It may or may not have any special significance. It was not found in any of the houses but was recovered from the lower part of one of the refuse mounds. Although smooth and slightly polished its surfaces are too rough for it to have been used as a rubbing stone. It may simply have been picked up and carried into the village by one of the children or its unusual form may have had a temporary attraction for one of the older inhabitants, who took it home with him only to discard it.

Another object which might be included in the fetish group but which certainly is indeterminate in its character was made from a piece of lignite. (Pl. 29, *f*.) It tends to the regular prism form, although the corners are rounded and one end is conical. All of its surfaces are smooth and show a fairly high degree of polish. What its function may have been is an unanswerable question. It probably belongs to that all-inclusive, frequently unsatisfactory, group of objects in which, as a last resort, the archeologist places such specimens, called the ceremonial.

One of the objects, made from red sandstone, has the general shape and characteristics of the clay cloud blowers discussed in preceding paragraphs. It is conical in shape and there is a bowl in the larger end. (Pl. 29, *g*.) The customary lengthwise perforation from the bottom of the bowl to the tip of the object is missing, however. There seems to be little question but that it represents an unfinished sandstone cloud blower. Such objects are not unknown in the Southwest, although they are by no means common.[91]

There was another group of stones which could not be considered under any of the classifications mentioned above. It was found in a bowl accompanying one of the burials and is composed of three azurite crystals which show attempts at polishing and six pieces of red ocher which also show rubbing. The latter no doubt furnished the raw material for some of the red paint used, perhaps, in the facial and body ornamentation of the owner. This material is a very common source for the red paint used by the Indians of the Southwest. A large fragment from a bowl was found in one of the houses, and in it was a cake of this red material which had been worked up, probably to use as paint. A chemical analysis was made of it by Dr. E. V. Shannon, assistant curator of the Division of Physical and Chemical Geology of the United States National Museum, who kindly furnished the following memorandum:

> The material seems to consist of about equal parts of red iron ocher (oxide), silica, sand, and organic matter. A part of the latter is easily combustible and may represent a grease binder of some sort. The balance is more refractory and may be ordinary humus. There also seems to be present a considerable amount of fine-cellular bony matter.

The present Pueblo Indians in the Southwest use grease in working up their body paints and it is interesting to note that those who occupied the area so long ago had the same custom. The sand and humus in the material can be accounted for on the basis of mixture since the structure went into ruin and was covered up. The bony matter might possibly have been in the grease binder. It may have

[91] Dr. G. P. Merrill, head curator of geology, U. S. National Museum, kindly assisted the writer in the identification of the stones used in the manufacture of the various objects.

been that some of the marrow from split bones was mixed with the paint and the particles included in that fashion.

ORNAMENTS

Stone in various forms furnished some of the material used in the manufacture of objects for personal adornment. Included in this group are pendants, beads, and objects for use in inlays or mosaics.

Pendants were made from hardened gypsum, turquoise, and hematite. (Pl. 30, *e*, *f*, *i*.) A rather curious feature of the small collection of ornaments secured is that there are only two definite pendants of stone material. The small hematite chip, *f*, shows careful rubbing and polishing but no perforation. That it had been intended to serve for a pendant is shown, however, by an incomplete perforation. The maker started to drill a hole through the substance, working from each side, but never finished it. Of the large number of turquoise flakes found in the excavations only one has a perforation. The others have been worked and polished and probably were used as a part of a mosaic.

The mosaic pieces seem to have been attached to some perishable material, perhaps wood or basketry, because in several instances the worked stones were found lying in a position which indicated that they had been attached to some object which had disintegrated. It is known from other sites that the base for mosaics occasionally consisted of basketry and in other instances of wood.

The stone beads were of two kinds, flat and tubular. The flat beads were made from alabaster, while the tubular ones seem to have been lignite. (Pl. 30, *g*, *k*.) Only one complete specimen, an unfinished bead, of the latter was found, although many broken fragments were observed.

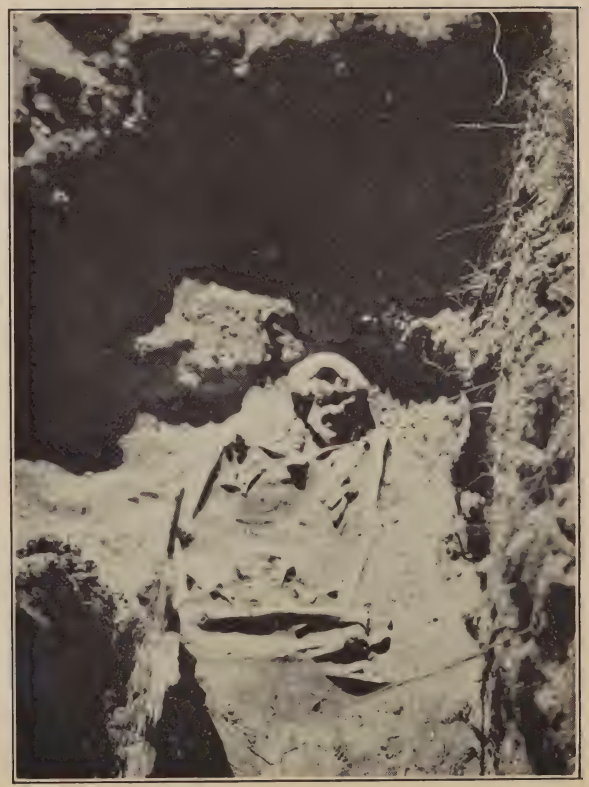
Shell Ornaments

Shell was also used for the making of ornaments. One fragment from a shell bracelet (*Glycymeris*); two pendants made from fresh-water mussel shells or river clams; one shell disk, unperforated, from a fresh-water mussel shell; and fragments from many olivella shell beads were found. (Pl. 30, *a*, *b*, *c*, *d*, *h*.) There is but one complete specimen of the latter. All of the others were broken or had reached such a stage of decay that they crumbled to dust soon after being removed from the ground.[92]

[92] Dr. W. B. Marshall, assistant curator of mollusks, U. S. National Museum, identified these specimens for the writer.

ORNAMENTS, STONE AND SHELL

a measures 1⅜ inches (3.5 cm.) in length



HUMAN BURIALS

HUMAN BURIALS

The number of burials found was small in comparison to what the death rate must have been for a village the size of that in the Chaco Canyon and for one which was occupied as long as the accumulations of débris indicate. The burials were more casual in their distribution than has been found to be the case at the sites of communities of later date. Instead of being concentrated in one of the refuse mounds they were scattered here and there throughout the village. The first convenient place for the scratching out of a shallow grave seems to have been the one chosen.

There was not a single burial in one of the storage bins. This is in considerable contrast to the Basket Maker II interments where the cistlike remains of the storage structures furnished most of the grave sites. In two instances the dead had been placed just outside storage bins and in two other cases they had been buried close to an outdoor fire pit, but for some reason the convenience of no longer used storage pits was overlooked. This seems strange when it is recalled that the two dogs were buried in the remains of a bin. There is, of course, the possibility that none of the bins was empty or had been abandoned at the time the burials were made, but the evidence discussed in connection with the bins tends to show that at least some of them had fallen into disuse.

The position of the body in the grave seems to have followed a fairly well established custom, as all but two of the skeletons were found with the head to the west, face to the north, lying partially on the left side with the knees drawn up in the flexed position. One of the exceptions had the head to the north, face to the west, and knees flexed in the same direction. The other had been buried with the head to the east, flat on its back, with the face upward and knees flexed in an upright position. In all but 5 of the 14 burials the grave had been scooped out of the subsoil and the remains were lying underneath the accumulated refuse and débris from the village. One of the five, as mentioned in the discussion of house B, had been buried in an oval pit in the floor of an abandoned dwelling. The other four were in actual rubbish. An interesting and significant feature is that three of the latter interments were the only ones found with mortuary offerings accompanying the skeletons. With none of the others was there any grave furniture.

The fact that 11 out of 14 skeletons uncovered had no accompanying objects should not be taken to signify that the people did not practice the custom of depositing offerings with their dead. Rather would it seem to indicate a factor of far greater significance, namely, that the people had not yet reached the stage when baskets were

entirely replaced by pottery vessels in the funerary offerings. The three burials which had pottery accompanying the skeletons were at a higher level, were in the refuse from the houses and not below it, and were unquestionably of a later date than those with no grave furniture.

During the Basket Maker II period many kinds of textiles, twined and woven bags, baskets and sandals were placed in the graves with the bodies of the dead. Religious beliefs and practices change slowly and the disposal of the dead is, with many primitive people, very closely interwoven with that side of their lives, so that burial customs would not change rapidly. In view of these facts it is the belief of the writer that the older interments were accompanied by baskets and such perishable materials which, because of the open nature of the site, long since have crumbled into dust and completely disappeared. In the interim between the older and later burials ceramics became more firmly established in the lives of the people, and, as a consequence, pottery began to replace baskets even as mortuary offerings.

One burial was found during the work of the preceding summer on the knoll west of Shabik'eshchee village. It had the general characteristics of the burials just discussed but is of interest for the different type of mortuary objects found accompanying the skeleton. There was no pottery in this instance, but close to the left side of the skull were three bone objects. One of them was a large spoon-like spatula, similar to the one described in the group of bone implements from the main village, and the other two were bone tubes, carefully cut and polished at the ends, apparently made from human femurs. The latter are thus far unique in the Southwest and no explanations as to their meaning are forthcoming.

Every skeleton had an undeformed dolichocepahlic skull. If there had been any of the brachycephalic people in the village it is very likely that in even as small a series as the present there would have been at least one, possibly two, skulls showing that form. Undeformed brachycephalic crania have been found in sites belonging to the late stages of this period,[93] indicating that the infiltration of newer peoples had already begun, but none of these were present in the remains from the Chaco village. Unfortunately the skeletal material was in such a poor state of preservation that it was almost impossible to remove it from the ground and the skulls have crumbled to such a degree that it will be impossible to make detailed craniometrical studies of them.

[93] Morris, Beginnings of Pottery Making, p. 133.

SUMMARY AND CONCLUSIONS

During the summer of 1926 a Late Basket Maker site was discovered in the Chaco Canyon, N. Mex. At that time two of the houses and several storage bins were excavated. The writer returned to the same location in 1927, when he uncovered, on a near-by knoll, the remains of a small village consisting of the ruins of 18 dwellings, a kiva, court, and 48 storage bins. All of the houses, the kiva, court, and 45 of the storage bins were cleared of the accumulated débris which filled their interiors.

Evidence shows that the houses had been quite substantial, although crude. They had consisted of a pit, circular, oval, or rectangular in contour, roofed over with a pole, brush, earth, and plaster superstructure. The earth walls of the subterranean portion of the dwellings had been covered with plaster or were faced with large stone slabs, in which case the latter had been covered with plaster.

Four posts set in the floor some distance from the corners supported the superstructure. It was postulated that these posts had carried a rectangular framework against which were placed the upper ends of small poles, the lower ends of which were embedded in the earth around the periphery of the pit. There was distinct evidence of these small poles which had formed the sloping upper walls of the houses. The rectangular space at the top of the framework is thought to have had a flat roof, although there was no definite evidence that such was the case, with an opening in the center to serve as a smoke hole, possibly on occasions as an entrance. It was found that the entire wooden structure had been covered with twigs, bark, earth, and plaster.

Little remained of the interior furnishings of the dwellings. Near the center of the room was a fire pit, varying in form, but usually either circular or rectangular. A short distance from the fire pit was a small circular hole in the floor which is thought to be analogous to the sipapu of later-day kivas, the mythical place of emergence through which many of the present Indians of the Southwest believe their ancestors passed on their journey from the underworld to the present surface of the earth. In this connection it was suggested that in the days when the Chaco village was inhabited each dwelling may have had its own shrine, whereas in following periods it was deemed essential only to the ceremonial house. In many of the structures rows of upright slabs formed a binlike compartment on the side in which the doorway was located. It was generally found that in the opening between the rows of slabs, between the fire pit and the doorway, an upright slab had been set in the floor. The

latter, like the deflector in kivas, would prevent cold air, rushing through the opening, from blowing directly onto the fire.

Most of the houses appeared to have had an entryway on the south or southeast side. The doorway of the main room gave access into a short passage which in turn opened into a small oval chamber. Occasionally this outer room was missing. The antechambers gave evidence of having been roofed over in much the same fashion as the main part of the dwelling, except that there were no interior supporting posts. Because of the smaller size of the structures the sloping side poles were able to carry the weight of the covering without additional aid. It was noted that the antechambers of these domiciles were suggestive of the entryways in earth lodges built by modern Indians, by some of the Eskimo, and even by the Palae-Asiatic peoples.

The remains of the dwellings showed that not all of them had been occupied contemporaneously. Closely associated with this feature was the discovery, in the fill of the kiva and in the two refuse mounds, that there had been an interval during which, apparently, the village was unoccupied. The evidence suggested that the original community consisted of houses B, D, E, F–1, G, I, K, N, O, and the kiva, together with certain of the storage bins. The burning of the kiva seems to have been responsible for the destruction of house F–1.

The break in occupancy came some time after the conflagration in the ceremonial chamber, and the latter could not have been directly responsible for the hiatus, as was shown by the fact that its pit had been used as a dumping place for refuse matter from the village over an interval immediately subsequent to the fire. It was suggested that the quiescent interval could be explained on the ground that despite the fact that the people had reached a fairly sedentary stage of culture they were inclined, on occasions, to revert to the nomadic form of life. This may have been forced on them by crop failures or other misfortunes or they may have made a pilgrimage to fairer hunting grounds, a practice not unknown among the Indians of later days.

The structures belonging to the second phase appear to have been A, C, F, H, J, L, M, P, Q, and the court. This would indicate that approximately the same number of families occupied the site during that stage in the existence of the village. The protokiva house and house X seem to belong to the latter period, and if such were the case, would indicate a slightly larger community.

The Chaco village remains indicate quite clearly that the type of house construction was in a period of transition as there undoubtedly was a change from circular to oval, to rectangular forms.

The foundations were being laid for the type of dwelling which was to become predominant in following periods. In this respect the ruins provide an interesting commentary on a long accepted theory regarding southwestern house development. Many have believed that the rectangular rooms of the Pueblo houses resulted from the practice of grouping many circular structures together with the resulting discovery that straight walls were superior to curved ones in the erection of a compact building. The Chaco houses show definitely, for that section at least, that the rectangular form of dwelling was evolved before the practice of grouping the units into a larger structure of several contiguous rooms was adopted.

Changing conditions are also to be observed in some of the later dwellings in the reduction in the size of the entryway and passage. In two of them, at least, it could not have served as an entrance at all, but only as a kind of ventilator. It was at this stage that the smoke hole assumed the added rôle of entrance hatchway. With reference to this it was suggested that the change may have been partly the outgrowth of former seasonal uses of the entry passage and the smoke-hole hatchway.

The houses in general were found to be quite typical of the period and to be closely comparable to the structures in other sections of the San Juan region. They are so characteristic, in fact, that they might just as well have been located in some of the large caves of Canyon del Muerto, a great center of the Late Basket Maker peoples, as on the rim of the Chaco Canyon. It may be suggested in passing that it is not thought that these early settlements were placed on high ground primarily for defensive purposes, but rather because of the better drainage thus provided. Even when dwellings were situated on the floor of the canyon they were located on higher ground, so that there was little likelihood of rain and water from melting snow running down into the pit portions of the dwellings. A further indication that such an idea was in the minds of the builders is to be noted in the entryways which, in practically all cases, were found to be close to or on a comparatively steep slope which would rapidly carry off all surface water.

Because of its large size and other characteristics the kiva is thought to be the possible prototype of the great kivas of the San Juan region, the centers of the major communal ceremonies. On the other hand, it is thought that the smaller kivas of the later periods were an outgrowth from the dwellings and the custom, during this earlier phase, of holding minor ritualistic observances in them. As a part of this postulation it was pointed out that the entry passage of the earlier houses remained as the ventilator of the later ceremonial chambers and that there was a distinct survival of the deflec-

tor-fire-pit-sipapu complex, possibly, also, a continuation in modified form of the compartment, features which place upon a firm foundation the theories advanced by earlier investigators in the Southwest in their efforts to explain the development and characteristic elements of the kivas.

Bins, in which was stored the corn raised on the canyon floor below, were simple in form and were constructed in the same manner as the dwellings. They differed, however, in that no interior support posts were used in the construction of the roof. The latter, like the antechamber coverings, was no doubt cone-shaped. There was no special system or plan of location for these storage bins; they were simply scattered here and there throughout the village in close proximity to the houses.

The material culture of this village is represented only by the imperishable objects of pottery, bone, stone, and a little shell. It was pointed out that other sites have demonstrated that the people of this cultural horizon had beautiful sandals, excellent baskets, twined and woven bags of a high degree of handiwork, but not a scrap of such material survived at the Chaco site. Hence the major portion of the picture of this phase of their life and industry is missing; all that remains are some of the minor details.

Pottery found at this village is crude when compared with that of following periods. It nevertheless shows a degree of development in its quality and technique when fragments from the upper layers of the refuse deposits are compared with those from lower strata. Characteristic forms were full-bodied jars with constricted, bottle-neck openings; full-bodied vessels with wide orifices; globular-shaped pots with a small opening at the top; pitchers; bowls; and ladles. There were no corrugated pieces of the type commonly found in pueblo ruins. The vessels are gray, brownish-white, white, or orange-red in color. Their surfaces are slightly pebbled, due to projecting particles of the tempering material used in the paste. In many cases the exteriors of vessels were covered with a wash, the "fugitive red." Decorated vessels have a thin pseudoslip which is attributed to a more careful rubbing of the unfinished vessel than was customary for the other forms. Ornamentation of the wares was largely confined to painted decorations on bowl and ladle interiors. The designs are simple and in general are highly suggestive of the basketry of the preceding period. The pigment normally is a brownish-black in color. The Chaco specimens represent the normal and characteristic form of Late Basket Maker pottery; what has been termed the "Standard complex."

There was considerable variety in the bone implements. They include awls, punches, bodkins, spatulate forms, and scrapers. Stone

objects were chiefly in the form of metates, manos, mauls, scrapers, knives, spearheads, and arrowheads. There were some stone ornaments. Shell was also used in the manufacture of beads and pendants.

The village had no definite cemetery. The dead were interred wherever it was found convenient to scoop out a shallow grave. In practically all cases the body had been placed on its back, head to the west, face to the north, with the knees flexed. Only three of the burials had accompanying mortuary offerings. The absence of grave furniture is not taken to indicate that the dead were buried without the usual offerings, but rather as suggesting that the funerary deposits were of materials which long since have crumbled into dust. It is considered as evidence, albeit of a negative sort, that in the early days of the village baskets were still the major containers and chief mortuary offerings. The skeletal remains show definitely that the inhabitants of the village were a long-headed group, and in that respect they agree with the physical type characteristic of the Basket Maker periods.

The writer feels that the evidence obtained from the Chaco village adds materially to the knowledge of this stage in the development of southwestern sedentary cultures and that it definitely substantiates the contention of recent investigators who hold that the Late Basket Makers, Basket Maker III, or Post-Basket Makers, constitute a distinct horizon in southwestern archeology. That they antedated the Pueblo cultures and followed the true phase of the Basket Makers, Basket Maker II, has been established in other districts. The Chaco investigations are thought not only to corroborate the findings of Kidder, Guernsey, and Morris but to add further evidence and to contribute new and valuable information on the period. Outstanding in the latter is a definite knowledge of the house type with its several characteristic features and its tendency to individual variation in minor factors of construction. The marked similarity of these structures to the pit dwellings or earth lodges of some of the Eskimo and those of certain of the Plains Indians is felt to be due to their development, at different periods and along slightly varying lines, out of a common ancestral form which probably had an Old World origin.

Another feature of some importance is the indication that, in the Chaco area at least, there was no sharp and distinct break culturally between the Late Basket Makers and the following periods. The material culture seems to show a steady, gradual development, each stage growing out of the preceding one in a quite orderly fashion. This may be interpreted as showing that the Basket Makers were not immediately replaced by the incoming group of round heads

and that there was a slow infiltration during which the latter took over and adapted the culture of the older people. Certain features were added, some were changed, and others were discarded during the process. There was nothing to indicate, however, the correct answer to the question as to what actually became of the Basket Makers. Whether, as was suggested in the introduction, they were completely absorbed by the newer group or whether they were finally driven out to locate elsewhere is still to be determined.

APPENDIX

Catalogue Number and Provenience of Objects Illustrated

Figure No.	Field No.	Provenience	National Museum Catalogue No.
Plate 11, a	71	Bin No. 35	340848
b	126	House X	340886
c	90	House P	340862
d	135	House N	340861
e	30	House D	340817
Plate 12		The village	340894
Plate 13, a	129	Burial No. 5	340889
b	131	Burial No. 11	340891
Plate 14		The village	340894
Plate 17, a	130	Burial No. 11	340890
b		Protokiva house	334115
Plate 18, a	29	House D	340816
b	54	House F–1	340835
c	55	do	340836
d	69	House K	340846
e	53	House F–1	340834
f	101	Trench south of house E	340818
Plate 19, a	42	House F–1	340827
b	86	House M	340858
c	115	House X	340879
d	87	House M	340858
e	117	House X	340879
f	66	House K	340845
g	18	House D	340810
h	6	House A	340801
i	7	do	340801
j	59	House H	340839
k	117	House X	340879
l	16	House D	340810
m	22	do	340810
n	170	Fajada dump [1]	340915
o	118	House X	[2]
p	16	House D	340810
q	59	House H	340839
r	74–A	House L	340851
s	41	House F–1	340827
t	32	House F	340819
u	170	Fajada dump [3]	340915

[1] Through an error this specimen from another Chaco Canyon site was included in the group to be photographed.
[2] Discarded at museum.
[3] Included through error.

CATALOGUE NUMBER AND PROVENIENCE OF OBJECTS ILLUSTRATED—Continued.

Figure No.	Field No.	Provenience	National Museum Catalogue No.
Plate 19, v	32	House F	340819
w	45	House F–1	340827
x	119	House X	340879
Plate 20, a	113	do	340877
b	58	House H	340839
c	65	House K	340845
d	73	House L	340851
e	1	House A	340801
f	2	do	340801
g	7	do	340801
h	116	House X	340879
i	73	House L	340851
j	102	Trench	340871
k	114	House X	340878
l	104	Trench near House F–1	340825
Plate 21, a	20	House D	340810
b	8	House A	340801
c	75	House L	340851
d	19	House D	340810
e	5	House A	340801
f	18	House D	340810
g	4	House A	340801
Plate 22, a	21	House D	340810
b	74	House L	340851
c	92	Bin No. 11	340864
d	15	House D	340809
e	67	House K	340845
f	103	Trench near house K	340850
g	94	Bin No. 27	340866
h	85	House M	340857
Plate 23, a	114	House X	340878
b	34	House F	340819
c	93	Bin No. 11	340865
d	78	House L	340851
e	17	House D	340810
f	66	House K	340845
g	43	House F–1	340827
h	105	Trench	340871
i	44	House F–1	340827
Plate 24, a	25	House D	340812
b	89	House N	340860
c	26	House D	340813
Plate 25, a	76	House L	340851
b	3	House A	340801
c	23	House D	340809
d	33	House F	340819
e	40	House F–1	340826
f	9	House A	340802
g	79	House L	340852

CATALOGUE NUMBER AND PROVENIENCE OF OBJECTS ILLUSTRATED—Continued.

Figure No.	Field No.	Provenience	National Museum Catalogue No.
Plate 25, h	46	House F–1	340828
i	46	do	340828
j	46	do	340828
k	120	House X	340880
l	24	House D	340811
m	24	do	340811
n	79	House L	340852
Plate 28, a	121–A	House X	340881
b	121–B	do	340881
c	122	do	340881
d	121–C	do	340881
e	98	Surface débris	340869
f	121–D	House X	340881
g	81	House L	340853
h	122	House X	340881
i	80	House L	340893
j	61	House H	340841
k	97	Trench	340869
l	36	House F	340821
m	106	Trench	340872
n	47	House F–1	340821
o	106	Trench	340872
p	106	do	340872
q	36	House F	340821
r	80	House L	340893
Plate 29, a	124	House X	340884
b	125	do	340885
c	50	House F–1	340831
d	83	House L	340855
e	100	Refuse mound	(4)
f	123	House X	340883
g	56	House F–1	340837
Plate 30, a	84	House L	340856
b	10	House A	340803
c	27	House D	340814
d	95	Surface débris	340867
e	52	House F–1	340833
f	37	House F	340822
g	60	House H	340840
h	38	House F	340823
i	108, 109	Court and kiva	340805, 340874, 340875
j		House F–1 and trench near F	340805
k		Court, kiva	340875

(4) Discarded at Museum.

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